December 25, 2007

Corrections to SDC45A/46A Digital Indicating Controller User's Manual for Installation and Configuration (No. CP-SP-1218E, 1st edition dated Nov., 2007)

Errors were found in the table in Chapter 10, "List of Communication Data," in the digits shown in the "EEPROM address, Hexadecimal" column.

Please apply the following corrections:

Incorrect	Correct
9***	5***
A***	6***
B***	7***
C***	8***

"***" indicates 3 alphanumeric characters.

For example, in the table on page 10-1, in the first row of data, the EEPROM address is given as 9000, but 5000 is correct. All addresses in the EEPROM address column should be corrected.

If the wrong address is used in a WRITE command, and the command is sent by communications, writing is done only in RAM. Therefore, after the power is turned off, the data stored in EEPROM will be restored.

Be sure not to use an incorrect address. If an incorrect address is used in communications, the wrong READ/WRITE operation will be carried out. A WRITE command using data that is outside of the proper range may be dangerous, because it could cause a controller operation error.

These errors will be corrected in the 2nd edition of the user's manual.

azbil

No. CP-SP-1218E

SDC45A/46A
Digital Indicating Controller
User's Manual
for
Installation and Configuration



Thank you for purchasing the SDC45A/46A Digital Indicating Controller.

This manual contains information for ensuring the correct use of the SDC45A/46A. It also provides necessary information for installation, maintenance, and troubleshooting.

This manual should be read by those who design and maintain equipment that uses the SDC45A/46A. Be sure to keep this manual nearby for handy reference.

Yamatake Corporation

RESTRICTIONS ON USE

This product has been designed, developed and manufactured for general-purpose application in machinery and equipment.

Accordingly, when used in applications outlined below, special care should be taken to implement a fail-safe and/or redundant design concept as well as a periodic maintenance program.

- Safety devices for plant worker protection
- Start/stop control devices for transportation and material handling machines
- Aeronautical/aerospace machines
- Control devices for nuclear reactors

Never use this product in applications where human safety may be put at risk.

NOTICE

Be sure that the user receives this manual before the product is used.

Copying or duplicating this user's manual in part or in whole is forbidden. The information and specifications in this manual are subject to change without notice.

Considerable effort has been made to ensure that this manual is free from inaccuracies and omissions. If you should find an error or omission, please contact Yamatake Corporation.

In no event is Yamatake Corporation liable to anyone for any indirect, special or consequential damages as a result of using this product.

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SAFETY REQUIREMENTS



To reduce risk of electric shock which could cause personal injury, follow all safety notices in this documentation.



This symbol warns the user of a potential shock hazard where hazardous live voltages may be accessible.

- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment must be impaired.
- Do not replace any component (or part) not explicitly specified as replaceable by your supplier.
- All wiring must be in accordance with local norms and carried out by authorized and experienced personnel.
- A switch in the main supply is required near the equipment.
- Main power supply wiring requires a (T) 1.0 A, 250 V fuse(s) (IEC 127).

EQUIPMENT RATINGS

Supply voltages:	100 to 240 Vac (operating power supply voltage 85 to 264Vac)
Frequency:	50/60 Hz
Power consumption:	30 VA maximum (SDC45A), 40 VA maximum (SDC46A)

EQUIPMENT CONDITIONS

Do not operate the instrument in the presence of flammable liquids or vapors.
Operation of any electrical instrument in such an environment constitutes a safety hazard.

Temperature:	0 to 50 ˚C
Humidity:	10 to 90 %RH (non-condensing)
Vibration:	2 m/s^2 (10 to 60 Hz)
Over-voltage category:	Category II (IEC60364-4-443, EN60664-1)
Pollution degree:	2

EQUIPMENT INSTALLATION

The controller must be mounted into a panel to limit operator access to the rear terminal.
Specifications of common mode voltage: The common mode voltages of all I/O except for main supply and relay outputs are less than 33 V r.m.s. max., 46.7 V peak max., and 70 Vdc max.

STANDARDS COMPLIANCE

EN61010-1, EN61326

SAFETY PRECAUTIONS

■ About Icons

The safety precautions described in this manual are indicated by various icons. Please be sure you read and understand the icons and their meanings described below before reading the rest of the manual.

Safety precautions are intended to ensure the safe and correct use of this product, to prevent injury to the operator and others, and to prevent damage to property. Be sure to observe these safety precautions.

⚠**WARNING**	Warnings are indicated when mishandling this product might result in death or serious injury.
⚠**CAUTION**	Cautions are indicated when mishandling this product might result in minor injury to the user, or only physical damage to the product.

■ Examples

	Use caution when handling the product.
	The indicated action is prohibited.
	Be sure to follow the indicated instructions.

⚠WARNING

	**Before connecting the SDC45A/46A to the measurement target or to external control circuits, make sure that the frame ground (FG) terminal is properly grounded with an earth ground of less than 100 Ω. Failure to so might cause an electric shock or fire.**
	**Before wiring, removing or mounting the SDC45A/46A, be sure to turn the power OFF. Failure to do so might cause electric shock or device failure.**
	**Incorrect wiring of the SDC45A/46A can damage the SDC45A/46A and lead to other hazards. Check that the SDC45A/46A has been correctly wired before turning the power ON.**
	**Do not touch electrically charged parts such as the power terminals. Doing so might cause electric shock.**
	**Do not disassemble the SDC45A/46A. Doing so might cause electric shock or device failure.**

⚠CAUTION

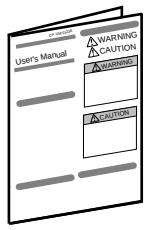
	**Use the SDC45A/46A within the operating ranges recommended in the specifications (temperature, humidity, voltage, vibration, shock, mounting direction, atmosphere, etc.). Failure to do so might cause fire or device failure.**
	**Do not block ventilation holes. Doing so might cause fire or device failure.**
	**Wire the SDC45A/46A properly using the specified types of wire and following recognized installation methods. Failure to do so might cause electric shock, fire or device failure.**
	**Do not allow wire clippings, chips or water to enter the controller case. They might cause fire or device failure.**
	**Firmly tighten the terminal screws to the torque listed in the specifications. Insufficient tightening of terminal screws might cause electric shock or fire.**
	**Do not use unused terminals on the SDC45A/46A as relay terminals. Doing so might cause electric shock, fire or device failure.**
	**We recommend attaching the terminal cover (sold separately) after wiring the SDC45A/46A. Failure to do so might cause electric shock.**

⚠CAUTION

	**Use the relays within the recommended service life.** **Failure to do so might cause fire or device failure.**
	**Use Yamatake Corporation's SURGENON if there is a risk of power surges caused by lightning.** **Otherwise, fire or device failure could result.**
	**Do not operate the keys with a mechanical pencil or other sharp-tipped object.** **Doing so might cause device failure.**
	**After the power has been turned ON, the SDC45A/46A does not operate for 2 to 60 s according to the settings.** **Therefore, great care should be taken if the relay output from the controller is used as an interlock signal.**

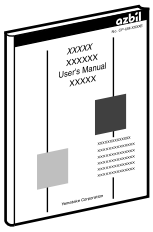
The Role of This Manual

A total of 4 different manuals are available for the SDC45A/46A. Read them as necessary for your specific requirements. If a manual you require is not available, contact Yamatake Corporation or its dealer.



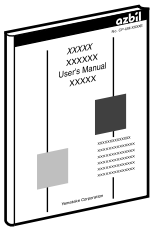
SDC45A/46A Digital Indicating Controller Installation Instructions
Manual No. CP-UM-5445E

This manual is supplied with the SDC45A/46A. Personnel in charge of design and/or manufacture of a system using the SDC45A/46A must thoroughly read this manual. This manual describes the safety precautions, installation, wiring, primary specifications, and transitions of key operations and displays. For further information about operation, refer to another manual, Installation and Configuration.



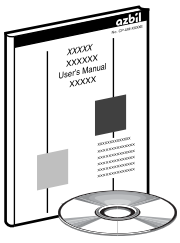
SDC45A/46A Digital Indicating Controller User's Manual for Displays and Settings
Manual No. CP-SP-1265E

The manual is a reference document necessary to set or change data. The manual lists up the displays, setup items, setting ranges, and initial values.



SDC45A/46A Digital Indicating Controller User's Manual for Installation and Configuration
Manual No. CP-SP-1218E

This manual. Personnel in charge of design, manufacture, operation, and/or maintenance of a system using SDC45A/46A must thoroughly read this manual. This manual also describes the installation, wiring, connections for communication, all functions and settings of the SDC45A/46A, operating procedures, troubleshooting, and detailed specifications.



SLP-C45 Smart Loader Package for the SDC45A/46A Digital Indicating Controller
Manual No. CP-UM-5458E

This manual is supplied with the SLP-C45 Smart Loader Package. The manual describes the software used to make various settings for the SDC45A/46A using a personal computer. Personnel in charge of design or setting of a system using SDC45A/46A must thoroughly read this manual. The manual describes installation of the software into a personal computer, operation of the personal computer, various functions, and setup procedures.

Organization of This User's Manual

This manual is organized as follows:

Flowchart of key operations and displays

This section summarizes the flowchart of key operations and displays of the SDC45A/46A in the diagram so as to describe them.

Chapter 1. OVERVIEW

This chapter describes the overview, features, model selection guide, and part names and functions of the SDC45A/46A.

Chapter 2. INSTALLATION

This chapter describes the environmental conditions and installation procedures when installing the SDC45A/46A.

Chapter 3. WIRING

This chapter describes the wiring procedures, wiring precautions, and connection examples.

Chapter 4. FUNCTIONS NECESSARY FOR CONTROL

This chapter describes the functions absolutely necessary to operate the control of the SDC45A/46A.

Chapter 5. OPERATION AND GENERAL FUNCTIONS

This chapter describes how to set the functions, which are normally used for the SDC45A/46A.

Chapter 6. FUNCTIONS OFTEN USED FOR OPERATIONS OTHER THAN CONTROL

This chapter describes how to set the functions, which are used for operations other than the control actions of the SDC45A/46A.

Chapter 7. FUNCTIONS USED AS REQUIRED

This chapter describes how to set the functions necessary for convenient operations of the SDC45A/46A.

Chapter 8. LIST OF SETTINGS

Refer to: "SDC45A/46A Digital Indicating Controller for Displays and Settings (CP-SP-1265E)".

Chapter 9. CPL COMMUNICATION FUNCTION

This chapter describes how to communicate the SDC45A/46A with a host unit, such as a personal computer or PLC through Yamatake's standard CPL communication using RS-485.

Chapter 10. LIST OF COMMUNICATION DATA

This chapter shows the list of communication data inside the memory of the SDC45A/46A.

Chapter 11. TROUBLESHOOTING

This chapter describes the troubleshooting of the SDC45A/46A.

Chapter 12. MAINTENANCE, INSPECTION, AND DISPOSAL

This chapter describes how to carry out the maintenance and inspection of the SDC45A/46A and how to dispose of the SDC45A/46A.

Chapter 13. SPECIFICATIONS

This chapter describes the general specifications, performance specifications, external dimensions, and optional parts of the SDC45A/46A.

Appendixes

These appendixes describe the function block diagrams, standard bit codes, standard numerical bit codes, and using characters and terms used in descriptions of this manual.

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Conventions Used in This Manual

The following conventions are used in this manual:

Handling Precautions:
Handling Precautions indicate items that the user should pay attention to when handling the SDC45A/46A.

Note: Notes indicate information that might benefit the user.

☞: This indicates the item or page that the user is requested to refer to.

(1), (2), (3): Numbers within parentheses indicate steps in a sequence or parts of an explanation.

[para] key, [<] key: Indicates keys on the panel.

"man" LED: Indicates various indicators on this unit.

>>: Indicates the result of an operation, details displayed on the personal computer or other devices, or the state of the device after operation.

- **Numeric value and character display on LED**
  - **7-segment LED**

Numeric values: The 7-segment LED expresses numeric values as follows:

0		1		2		3		4		−1	
5		6		7		8		9			

Alphabetical characters: The 7-segment LED expresses alphabetical characters shown below. There are some alphabetical characters, which are not displayed on the LED.

A a		B b		C c		D d		E e	
F f		G g		H h		I i		J j	
K k		L l		M m		N n		O o	
P p		Q q		R r		S s		T t	
U u		V v		Y y		Z z		−	

Handling Precautions

- As shown above, numeric value "2" and alphabetic character "Z" are shown in the same manner.
  Accordingly, numeric value "5" and alphabetic character "S", as well as numeric value "9" and alphabetic character "Q" are also shown in the same manner.

● **11-segment LED**

Numeric values: The 11-segment LED expresses numeric values as follows:

0		1		2		3		4	
5		6		7		8		9	

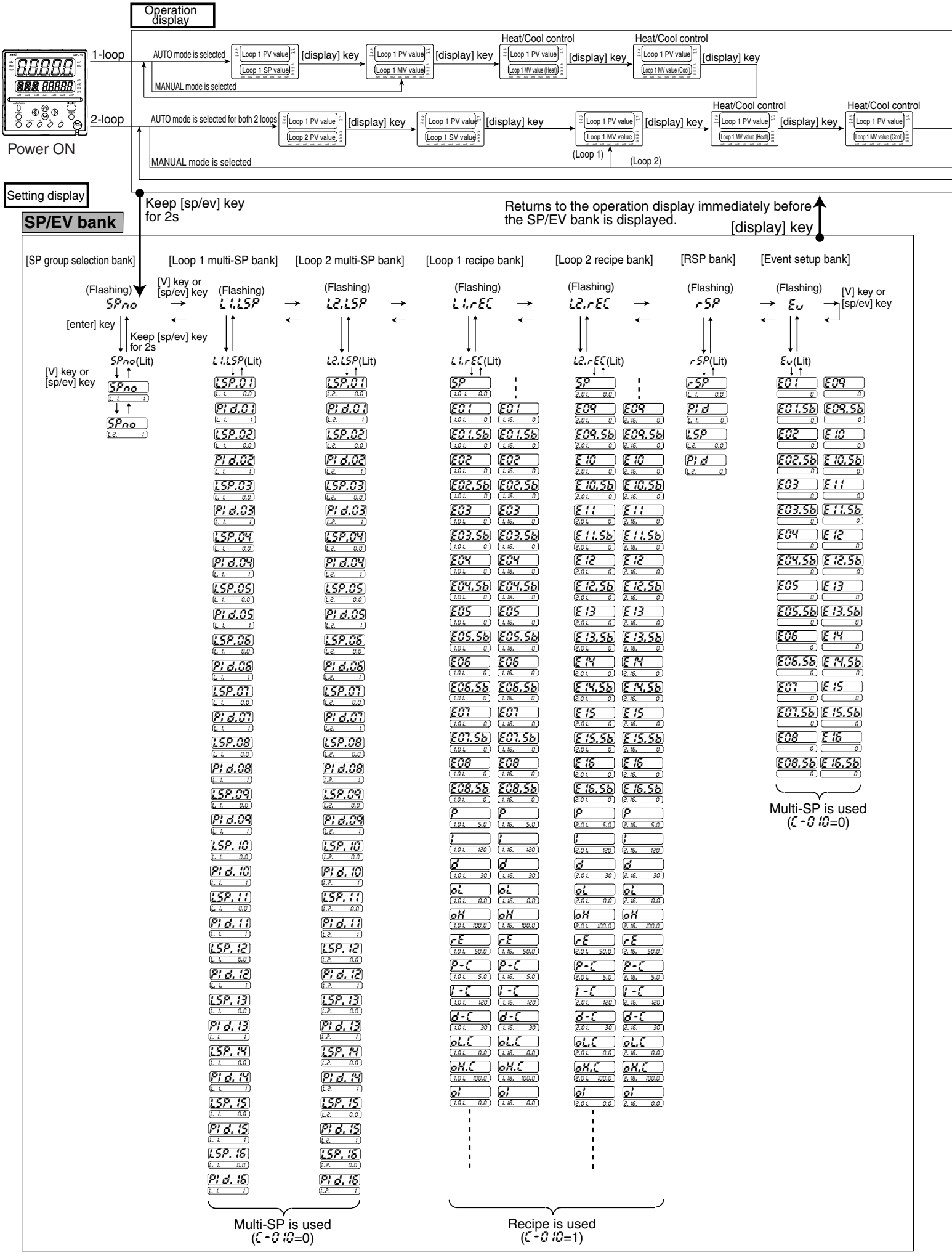
Alphabetical characters: The 11-segment LED expresses alphabetical characters shown below. There are some alphabetical characters, which are not displayed on the LED.

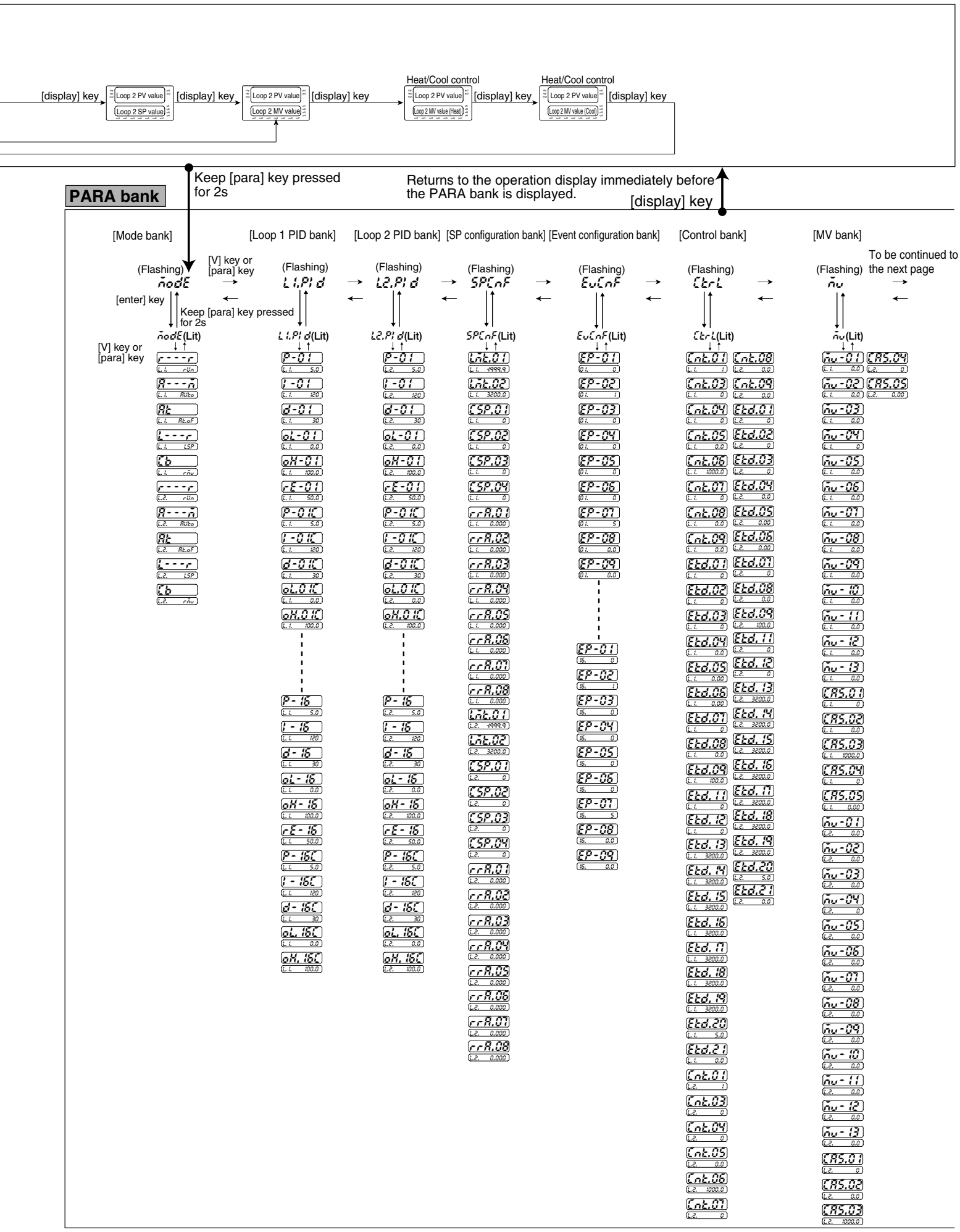
A a		B b		C c		D d		E e		F f	
G g		H h		I i		J j		K k		L l	
M m		N n		O o		P p		Q q		R r	
S s		T t		U u		V v		W w		X x	
Y y		Z z									

Handling Precautions

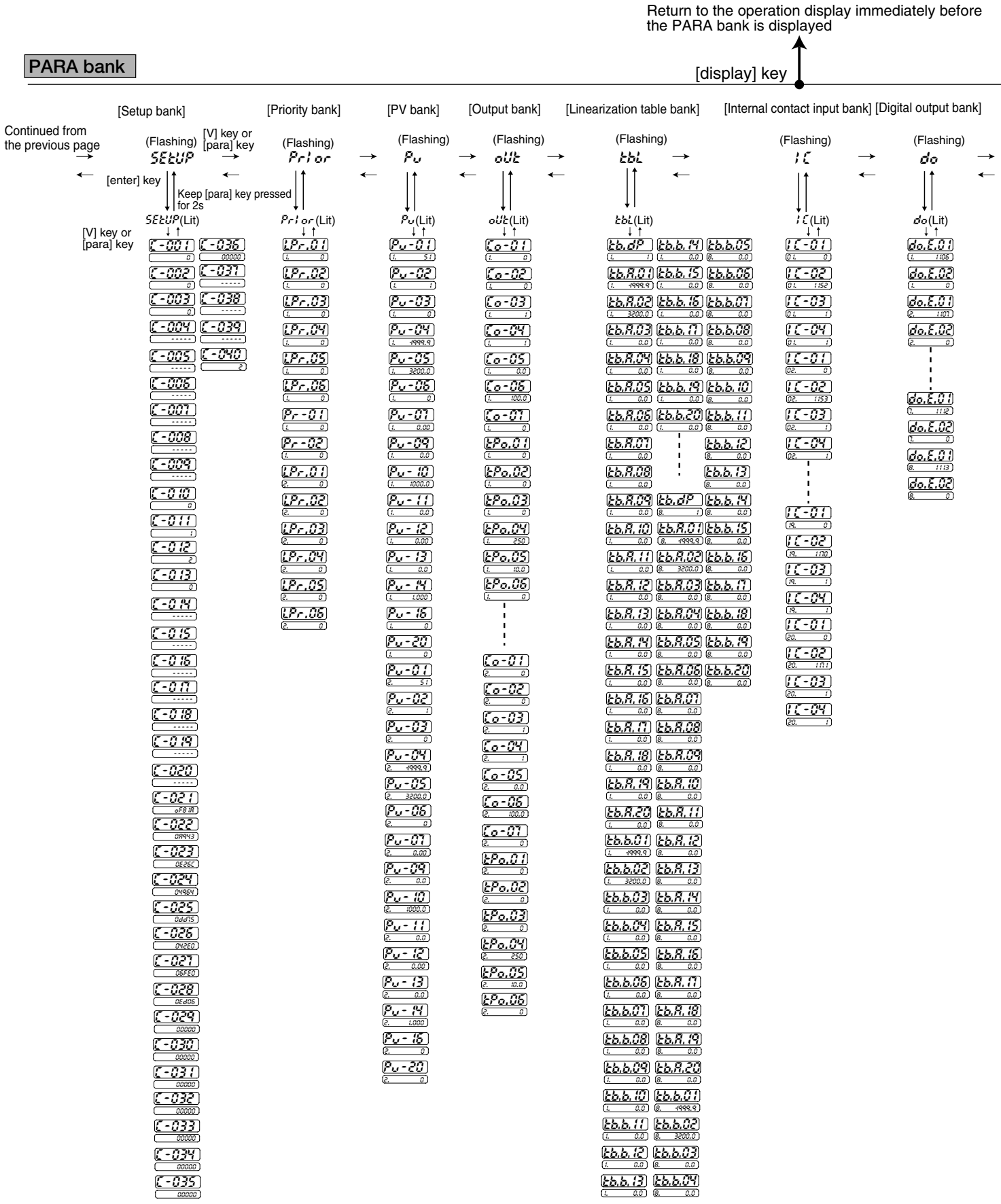
- As shown above, numeric value "5" and alphabetic character "S" are shown in the same manner.

Flowchart of key operations and displays



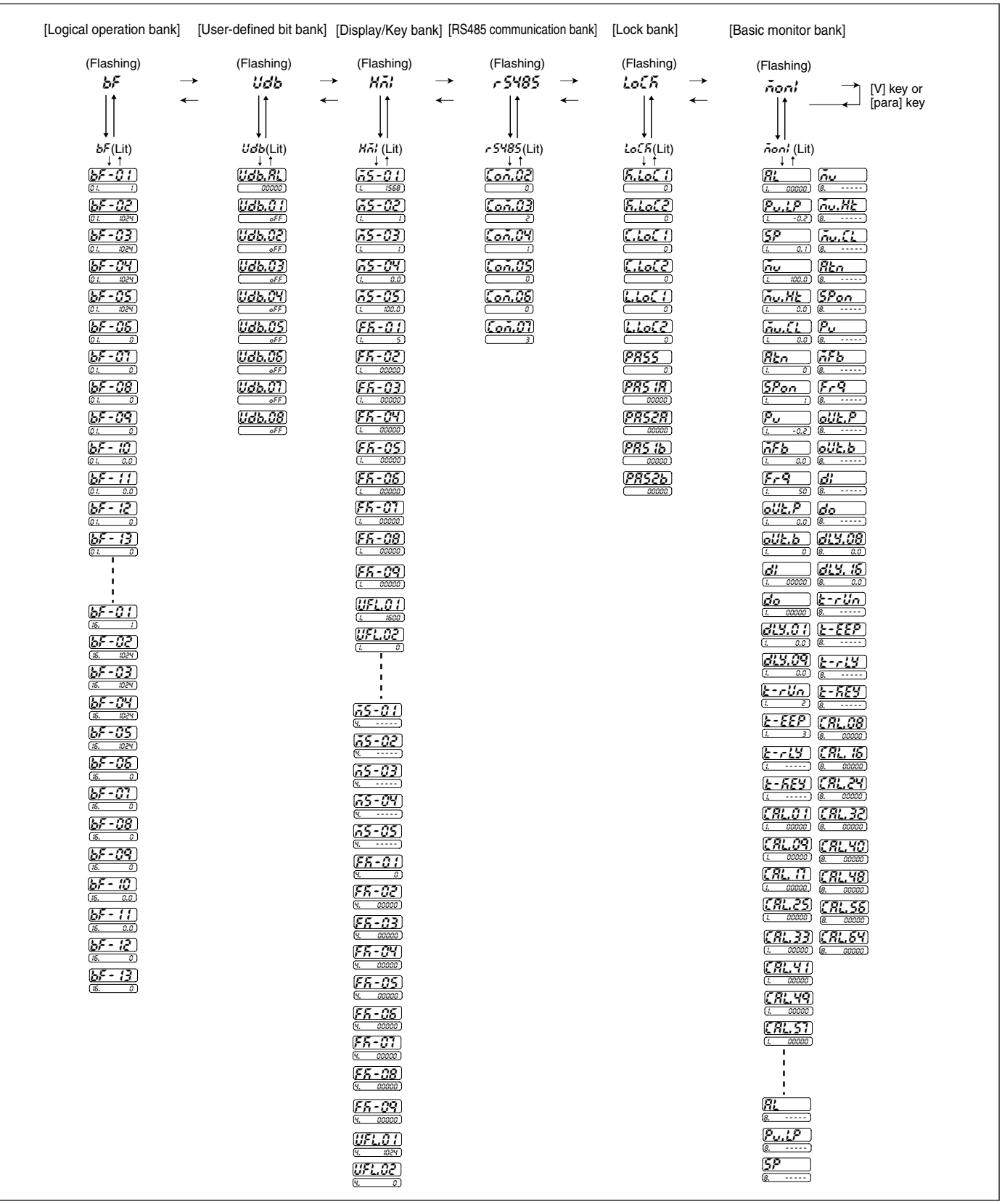

[display] key
Loop 2 PV value
Loop 2 SP value
[display] key
Loop 2 PV value
Loop 2 MV value
[display] key
Heat/Cool control
Loop 2 PV value
Loop 2 MV value (Heat)
[display] key
Heat/Cool control
Loop 2 PV value
Loop 2 MV value (Cool)
[display] key
PARA bank
Keep [para] key pressed for 2s
Returns to the operation display immediately before the PARA bank is displayed.
[display] key
[Mode bank]
[Loop 1 PID bank]
[Loop 2 PID bank]
[SP configuration bank]
[Event configuration bank]
[Control bank]
[MV bank]
To be continued to the next page
(Flashing)
[V] key or [para] key
[enter] key
Keep [para] key pressed for 2s
(Lit)
[V] key or [para] key

PARA bank


Return to the operation display immediately before the PARA bank is displayed
[display] key
[Setup bank]
[Priority bank]
[PV bank]
[Output bank]
[Linearization table bank]
[Internal contact input bank]
[Digital output bank]
Continued from the previous page
(Flashing)
[V] key or [para] key
[enter] key
Keep [para] key pressed for 2s
(Lit)

■ Movement within bank

- Forward movement
  [sp/ev] key or [V] key (SP/EV bank)
  [para] key or [V] key (PARA bank)
- Backward movement
  [∧] key



Chapter 1. OVERVIEW

1 - 1 Overview and Features

■ Overview

The SDC45A/46A (hereafter referred to as "this unit" in this manual) is a digital indicating controller designed to control the temperature, pressure, flow rate, pH, and liquid level. Up to two full-multi range input points can be mounted. Therefore, this unit is applicable to various control modes, such as single-loop PID control.
The following features are provided to achieve complicated process controls. Thus, this unit can be used for a wide variety of applications.

■ Features

- High speed and high accuracy
  This unit coexists an input sampling cycle of 25 ms, 5-digit display, and an indication accuracy of ±0.1 %. Therefore, this unit can be utilized in various kinds of industrial fields, from semi-conductor manufacture system requiring fast-response and reproducibility to plant control including chemical reaction process.

- Multi-loop input
  Up to two full multi-range input points can be mounted. According to this function, the control modes, such as single-loop PID control (remote SP input), 2-loop PID control, cascade control, and backup control can be made with only one unit. The control mode can be changed by data settings.

- Improvement of visibility and operability
  High-intensity LEDs are used for the display part. This ensures excellent visibility. Additionally, a model that uses orange LEDs for all display parts is also available. This ensures good visibility even though the unit is installed outdoors.
  As for operation keys, various kinds of mode keys, and [∧], [∨], [<], and [>] keys are arranged. This ensures easy setting and mode change. A mechanical key mechanism is utilized for the main body, ensuring convenient operation with click-feeling.

- Achievement of advanced control
  The control action incorporates a new algorithm "Ra-PID (Rationa LOOP PID)"and "Just-FiTTER." Three types of auto tunings are prepared by assuming a variety of cases. This ensures easy obtaining of optimal control results.
  Additionally, input and output linearization approximation tables are provided as standard functions. This ensures optimal control results, which cannot be obtained with normal PID only. Also, use of two output points makes it possible to perform the heat/cool control.

- Various input and output forms
  Up to seven output points can be mounted on the SDC46A while up to five output points can be mounted on the SDC45A. Output point types can be selected from the relay contact, voltage pulse, current, continuous voltage, and power supply (24 Vdc) for the transmitter.
  Since multiple kinds of output forms are mounted on this unit, outputs can be connected to various final control elements through this one unit.
  (control output assignments can be changed freely by means of settings.)

Additionally, the DI and DO points of the SDC46A can be extended to up to 14 DI points and 8 DO points using optional functions. By exchanging the I/O with the PLC, auto operation of the equipment, mode change, various alarms, and statuses can be controlled, contributing to safe operation of the equipment.

- Personal computer loader supported
  A personal computer loader provides a monitoring function. Data setting, as well as device monitor and trend functions are provided. This unit can also be used as a simple data logger.

1 - 2 Model Selection Table

■ SDC45A (with 14-digit model No.)

All units have 2 digital inputs.

Basic model No.	Input model	Power supply	Output 1, 2	Output 3, 4	Output 5	Output 6, 7	Option	Addition 1	Addition 2	Specifications
C45A										Standard model
	1									1 full multiple input
	2									2 full multiple inputs
		A								100 to 240 Vac
			1							1 form 1a1b relay
			2							2 form 1a relays
				C0						Current (output 3)
				D0						Continuous voltage output (output 3)
				V0						Voltage pulse (output 3)
				RR						2 form 1a relays
				CC						2 current outputs
				VV						2 voltage pulse outputs
				CV						Current (output 3) + voltage pulse (output 4)
					0					None
					R					Form 1a relay
					C					Current
					D					Continuous voltage output
					P					Transmitter power supply
						0				None
							0			None
							1			8 digital inputs
							2			8 digital outputs
							3			8 digital outputs + RS-485 communication
								0		None
								T		Tropicalization treatment
								K		Anti-sulfide treatment
								D		Inspection certificate
								B		Tropicalization treatment + inspection certificate
								L		Anti-sulfide treatment + inspection certificate
								Y		Complying with the traceability certification
									0	None
									1	LEDs: all orange

■ SDC46A (with 14-digit model No.)

All units have 2 digital inputs.

Basic model No.	Input model	Power supply	Output 1, 2	Output 3, 4	Output 5	Output 6, 7	Option	Addition 1	Addition 2	Specifications
C46A										Standard model
	1									1 full multiple input
	2									2 full multiple inputs
		A								100 to 240 Vac
			1							1 form 1a1b relay
			2							2 form 1a relays
				C0						Current (output 3)
				D0						Continuous voltage output (output 3)
				V0						Voltage pulse (output 3)
				RR						2 form 1a relays
				CC						2 current outputs*
				VV						2 voltage pulse outputs
				CV						Current (output 3) + voltage pulse (output 4)
					0					None
					R					Form 1a relay
					C					Current*
					D					Continuous voltage output
					P					Transmitter power supply
						0				None
						1				Current (output 6)
						2				Transmitter power supply (output 7)
						3				2 current outputs*
						4				Current (output 6) + transmitter power supply (output 7)
							0			None
							1			12 digital inputs
							2			12 digital inputs + 8 digital outputs
							3			12 digital inputs + 8 digital outputs + RS-485 communication
								0		None
								T		Tropicalization treatment
								K		Anti-sulfide treatment
								D		Inspection certificate
								B		Tropicalization treatment + inspection certificate
								L		Anti-sulfide treatment + inspection certificate
								Y		Complying with the traceability certification
									0	None
									1	LEDs: All orange

* Cannot be selected when both "CC" is selected for outputs 3 and 4 and "C" is selected for output 5.

■ SDC45A/C46A (with 7-digit model No.)

Displays have all-orange LEDs.

Basic model No.	Set No.	Option 1	Option 2	Specifications
C45A				Standard model: Basic model, 2 alarm outputs
	0			None
		0		Regular type 1: 1 current + 2 relay outputs + 2 digital inputs
		1		Regular type 2: 1 current + 1 voltage pulse + 1 relay output + 2 digital inputs
		3		Regular type 3: 2 current outputs + transmitter power supply (24V) + 2 digital inputs
			0	None
			1	Communications (RS-485) + PV input 2 + 8 digital outputs
			2	PV input 2 + 8 digital outputs
			3	8 digital outputs
			4	PV input 2

Basic model No.	Set No.	Option 1	Option 2	Specifications
C46A				Standard model: Basic model, 1 current output + 2 alarm outputs
	0			None
		0		Regular type 1: 1 current + 2 relay outputs + 2 digital inputs
		1		Regular type 2: 1 current + 1 voltage pulse + 1 relay output + 2 digital inputs
		3		Regular type 3 : 1 current + 2 relay outputs + transmitter power supply (24V) + 2 digital inputs
			0	None
			1	Communications (RS-485) + PV input 2 + 12 digital inputs + 8 digital outputs
			2	PV input 2 + 12 digital inputs + 8 digital outputs
			3	12 digital inputs + 8 digital outputs
			4	PV input 2

■ Accessories and optional parts

● Accessories

Name		Model No.
Mounting bracket		81405411-004
Gasket	(for SDC45A)	81421863-001
	(for SDC46A)	81421864-001

● Optional parts

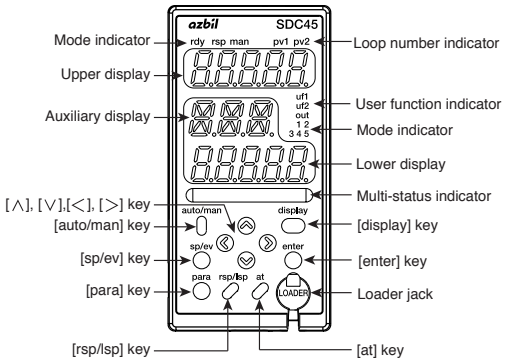
Name	Model No.
Mounting brackets (2)	81405411-003
Terminal cover*	81441420-001

* The SDC45A needs 1 terminal cover while the SDC46A needs 2.

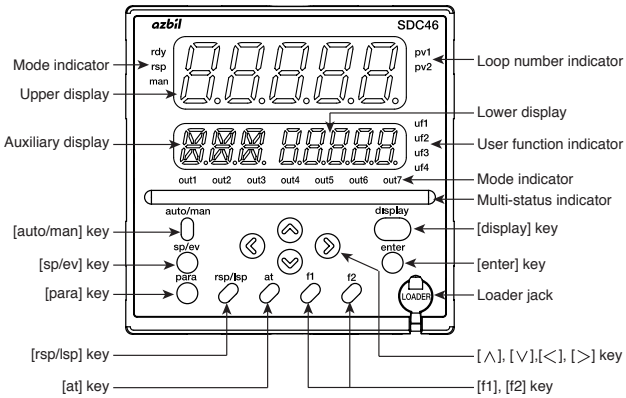
1 - 3 Names and Functions of Parts

■ Front panel

● SDC45A



● SDC46A



● Description

Upper display: Displays PV (present temperature etc.) or setup items.
Lower display: Displays SP (set temperature, etc.) and other parameters.
Auxiliary display: Displays group No., loop No., and channel No. of setup item.
Multi-status indicator: Indicates MV or DI/DO status.
Mode indicators:
- rdy: Lights up in READY mode.
- rsp: Lights up in RSP (remote setting input) mode.
- man: Lights up in MANUAL mode.
- out1-7: Light up when the output is ON (SDC45A: out1-5). Always lit when the output is current or continuous voltage.

User function indicators:
- uf1-4: Light under user-assigned conditions (SDC45A: uf1, uf2).

Loop number indicators:
- pv1, pv2: Light up to indicate which loop has the displayed PV value.

[∧], [∨],[<], [>] keys: Used to increment/decrement numeric values and shift between digits or settable items.
[auto/man] key: Used to change AUTO/MANUAL mode.
[sp/ev] key: Used to set the SP/EV bank.
[display] key: Used to change the display contents in the operation display mode.
[para] key: Used to set the PARA bank.
[enter] key: Used in initiating setup and to confirm changed values.
[f1], [f2] key: Used for user-assigned functions. (SDC46A only).
[at] key: Used to execute/cancel auto-tuning, or for user-assigned functions.
[rsp/lsp] key: Used to change between remote and local set point, or for user-assigned functions.
Loader jack: Jack for connection of PC loader cable (with cap).

■ Rear panel

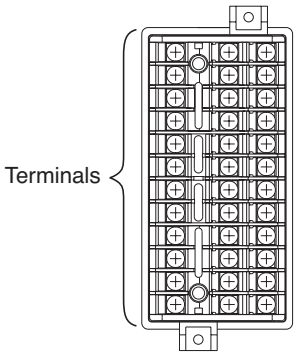
The rear panel of this unit contains terminals used to connect the power supply, inputs, and/or outputs.

For connections, always use crimp terminals suitable for M3 screws.

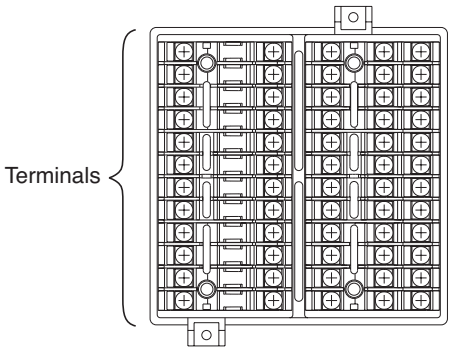
Terminal screws: M3

Tightening torque of terminal screws: 0.4 to 0.6 N·m or less

● **SDC45A**

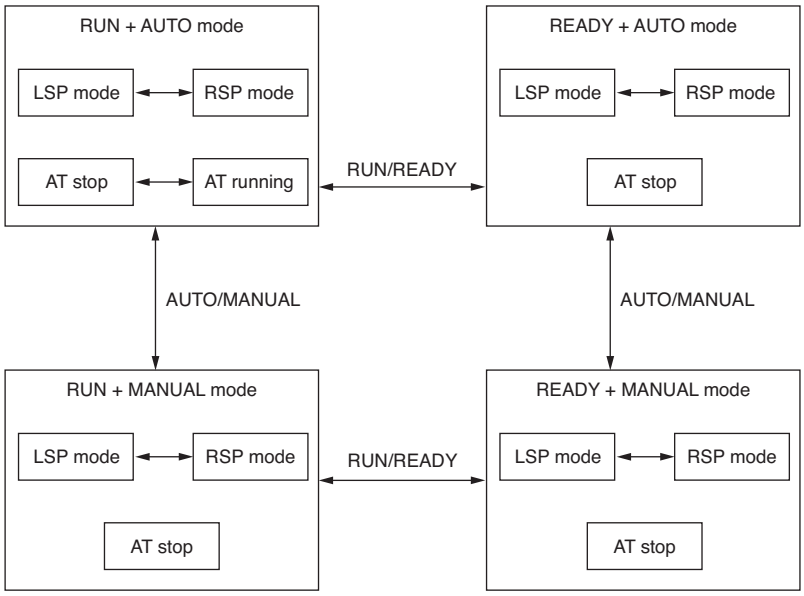


● **SDC46A**



1 - 4 Operation Modes

The following shows the transition of operation modes:



RUN: Control status

READY: Control stop status

AUTO: Automatic operation (This unit automatically determines the MV values.)

MANUAL: Manual operation (The MV values are operated manually.)

LSP: Local SP (The control is performed using the SP stored in the measuring instrument.)

RSP: Remote SP (The analog input from the external device is used as SP.)

AT: Auto tuning (The PID constants are set automatically using the limit cycle.)

When performing the 2-loop control with a 2-input model, the operation mode can be changed independently in each loop.

Chapter 2. INSTALLATION

⚠ CAUTION

Use the SDC45A/46A within the operating ranges recommended in the specifications (temperature, humidity, voltage, vibration, shock, mounting direction, atmosphere, etc.).
Failure to do so might cause fire or faulty operation.

Do not block ventilation holes.
Doing so might cause fire or faulty operation.

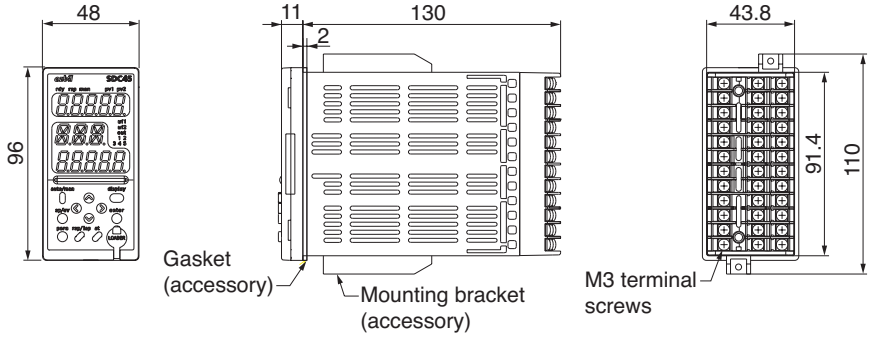
■ Location

Install the controller in a location that meets the following criteria:

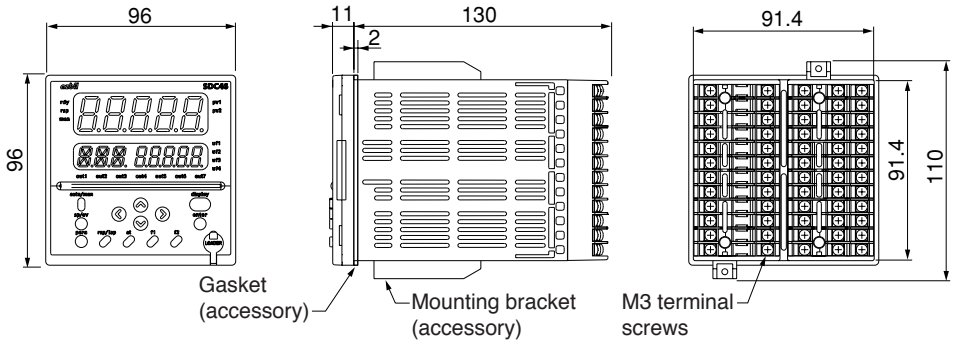
- Voltage to ground of 33 Vr.m.s. max., 46.7 V peak max., and 70 Vdc max.
- No high/low temperature/humidity.
- Free from sulfide gas or corrosive gas.
- Not dusty or sooty.
- Protected from direct sunlight, wind, and rain.
- Little mechanical vibration or shock.
- Not close to high voltage line, welding machine or other electrical noise generating source.
- At least 15 meters away from the high voltage ignition device for a boiler.
- No strong magnetic fields.
- No flammable liquid or gas.

■ External dimensions

● **SDC45A** Unit: mm



● **SDC45A** Unit: mm

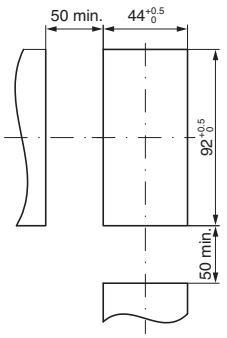


■ Panel cutout dimensions

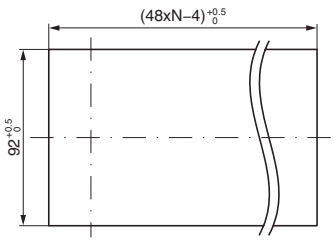
Make the mounting holes according to the panel hole marking dimensions.

● **SDC45A** Unit: mm

Stand-alone mounting

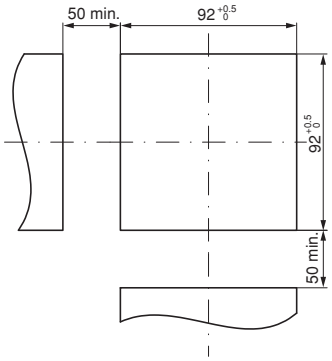


Gang-mounting

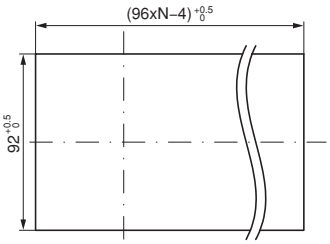


● **SDC46A** Unit: mm

Stand-alone mounting



Gang-mounting



! Handling Precautions

- When used as a waterproof unit, be sure to install a gasket.
- When three or more units are gang-mounted horizontally, the maximum allowable ambient temperature is 40 °C.
- Provide a space of at least 50 mm or more above and below the controller.

■ Mounting procedure

- The mounting must be horizontal with the back not tilted more than 10° up or down.
- The mounting panel should be rigid and no more than 7 mm thick (5 mm max. when a gasket is used).

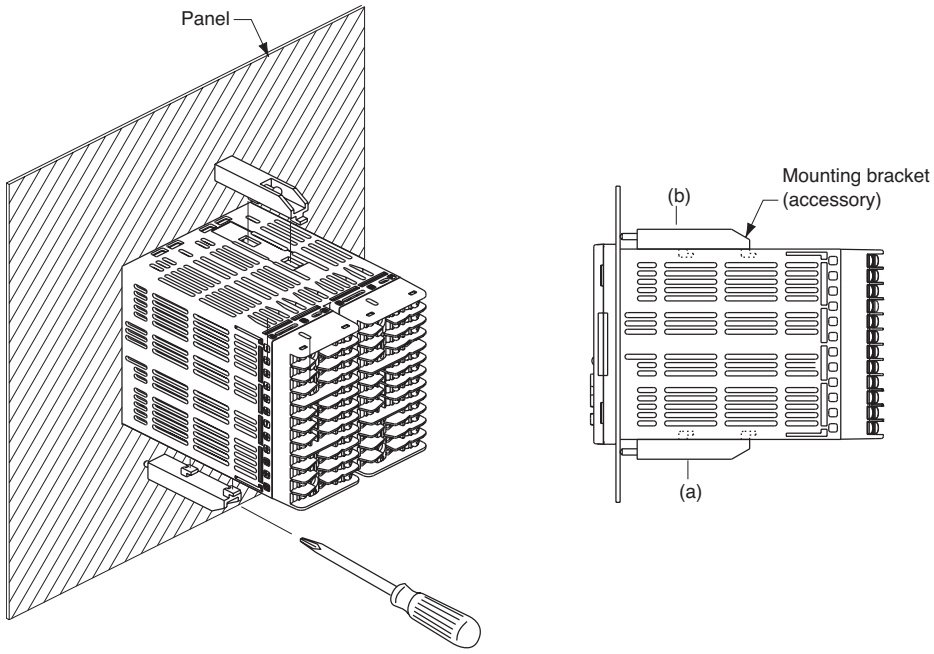
⚠ Handling Precautions

- When used as a waterproof unit, be sure to install a gasket.

● Ordinal mounting

Tools: Phillips-head screwdriver

(1) Insert this unit from the front of the panel.
(2) Fix the top and bottom of this unit firmly with the mounting brackets (accessory). When mounting this unit, mount the lower mounting bracket (a) first.



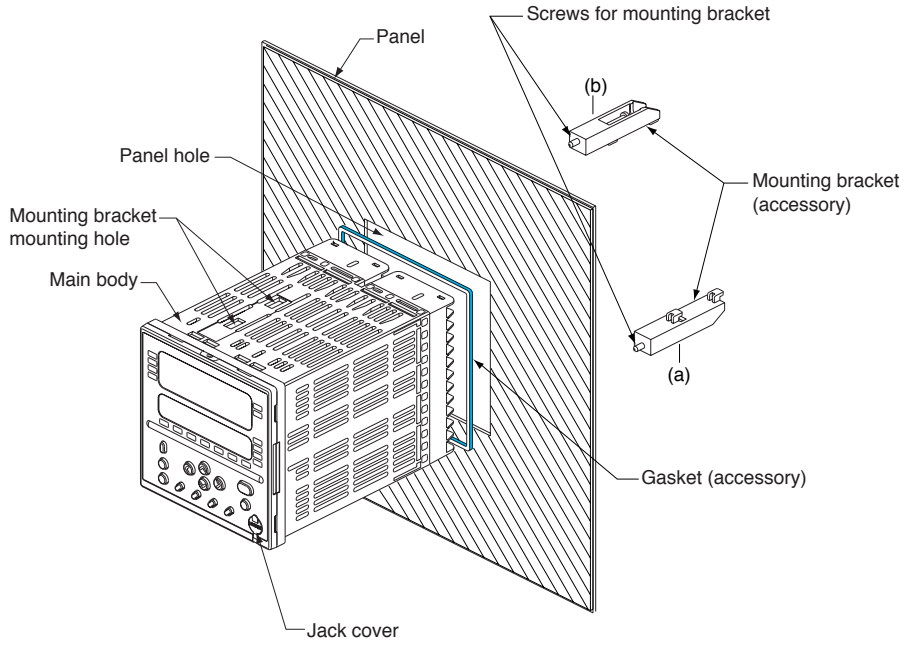
(3) To fasten this controller onto the panel, tighten the mounting bracket screws, and turn one more turn when there is no play between the bracket and panel.

⚠ Handling Precautions

- Excessive tightening of the screws may deform the controller case.

● Waterproof mounting

Tools: Phillips-head screwdriver



(1) Mount the gasket on the flange part of this unit.

(2) Make sure that the jack cover is inserted to the front panel of this unit firmly.

(3) From the front of the panel, insert this unit with the gasket mounted.

(4) Fix the top and bottom of the main body firmly from the rear of the panel with the mounting brackets (accessory).

When mounting this unit, mount the lower mounting bracket (a) first.

(5) To fasten this controller onto the panel, tighten a mounting bracket screws, and turn one more turn when there is no play between the bracket and panel.

! Handling Precautions

- Excessive tightening of the screws may deform the controller case.
- If gang-mounted, dustproof and waterproof protection may not be maintained.

Chapter 3. WIRING

3 - 1 Wiring Precautions

⚠WARNING

- Before connecting the SDC45A/46A to the measurement target or to external control circuits, make sure that the frame ground (FG) terminal is properly grounded with an earth ground of less than 100 Ω. Failure to so might cause an electric shock or fire.
- Before wiring, removing or mounting the SDC45A/46A, be sure to turn the power OFF. Failure to do so might cause electric shock or device failure.
- Incorrect wiring of the SDC45A/46A can damage the SDC45A/46A and lead to other hazards. Check that the SDC45A/46A has been correctly wired before turning the power ON.
- Do not touch electrically charged parts such as the power terminals. Doing so might cause electric shock.
- Do not disassemble the SDC45A/46A. Doing so might cause electric shock or device failure.

⚠CAUTION

- Wire the SDC45A/46A properly using the specified types of wire and following recognized installation methods. Failure to do so might cause electric shock, fire or device failure.
- Do not allow wire clippings, chips or water to enter the controller case. They might cause fire or device failure.
- Firmly tighten the terminal screws to the torque listed in the specifications. Insufficient tightening of terminal screws might cause electric shock or fire.
- Do not use unused terminals on the SDC45A/46A as relay terminals. Doing so might cause electric shock, fire or device failure.
- We recommend attaching the terminal cover (sold separately) after wiring the SDC45A/46A. Failure to do so might cause electric shock.
- Use the relays within the recommended service life. Failure to do so might cause fire or device failure.
- Use Yamatake Corporation's SURGENON if there is a risk of power surges caused by lightning.
  Otherwise, fire or device failure could result.

■ Wiring precautions

- Be sure to provide a switch within operator reach for shutting off the main power supply to the controller in the main supply wiring. Also, the main supply wiring also requires a time-lagged (T) fuse rated at 1.0 A, 250 V. (IEC127)
- Symbols in the terminal wiring label on the controller side:

Symbols	Meaning
~	AC power supply
⎓	DC power supply
⚠	Caution, danger of electric shock
⚠	Caution

- Before wiring the SDC45A/46A, verify the controller's model No. and terminal Nos. written on the label on the side. Inspect all wiring once wiring work has been completed.
- Use M3 crimp-type terminal lugs for wiring to terminals.

  The tightening torque of the terminal screw must be 0.4 to 0.6 N·m or less.
- Leave a distance of at least 50 cm between I/O lead wires or communications lead wires and power lead wires. Also, do not pass these lead wires through the same conduit or wiring duct.
- Be careful not to allow any crimp-type terminal lugs to touch adjacent terminals.
- Be sure that any device or equipment which is connected to this controller has adequate insulation for the controller's power supply voltage and maximum I/O voltages.
- The controller requires 2 to 60 seconds according to the settings to start up once the power is turned ON. A warm-up time of at least 30 minutes is recommended to allow the controller to attain the specified accuracy.

3 - 2 Recommended Cables

- Contact the thermocouple wires to the terminals in case of a thermocouple input. When a thermocouple is connected to terminals, or wiring distance is long, connect the wire via a shielded compensating lead wire.
- For input/output other than thermocouples, use a JCS 4364 instrument cable or equivalent (generally called twisted shielded cable for instrumentation use). Recommended twisted shielded cables are:

Fujikura Ltd.	2 conductors	IPEV-S-0.9 $mm^2 \times 1P$
	3 conductors	ITEV-S-0.9 $mm^2 \times 1T$
Hitachi Cable, Ltd.	2 conductors	KPEV-S-0.9 $mm^2 \times 1P$
	3 conductors	KTEV-S-0.9 $mm^2 \times 1T$

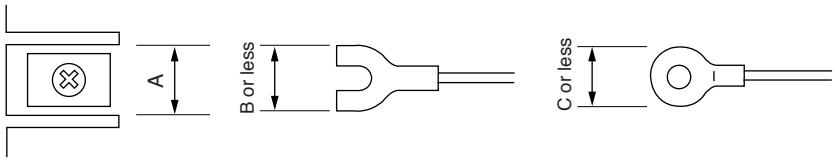
- A shielded multiconductor microphone cord (MVVS) may be used, if electromagnetic induction noise is comparatively low.

3 - 3 Terminal Connections

⚠CAUTION

- Firmly tighten the terminal screws to the torque listed in the specifications. Insufficient tightening of terminal screws might cause electric shock or fire.
- Do not use unused terminals on the SDC45A/46A as relay terminals. Doing so might cause electric shock, fire or device failure.
- We recommend attaching the terminal cover (sold separately) after wiring the SDC45A/46A. Failure to do so might cause electric shock.

For wiring of SDC45A/46A, use an appropriate crimp type terminal lug suitable for the M3 screw.



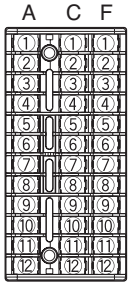
Applicable screw size	Terminal dimensions (mm)			Recommended crimp terminal JIS indication	Applicable electrical wire size	JST Mfg. Co. Model No. (Reference)
	A	B	C			
M3	6.1	5.8	5.8	RAV1.25-3	0.3 to 1.3 mm^2 AWG22 to 16	V1.25-3 V1.25 B3A

Handling Precautions

- When installing this unit in a place where the vibration or impact is large, always use an appropriate round crimp type terminal lug to avoid loose terminal connections.
- Pay special attention so that no crimp type terminal lugs are in touch with adjacent terminals.
- The tightening torque of the terminal screw must be 0.4 to 0.6 N•m or less.

3 - 4 Terminal Wiring Diagram

■ SDC45A terminals



A

Description	
(1) ① ② ③	Power supply (1) AC power supply 100 to 240 Vac
(1) ④ 1 ⑤ 2 ⑥ (2) ④ 1 ⑤ 2 ⑥	Output 1, Output 2 (OUT1/OUT2) (1) Relay (1a1b) (2) Relay 2 (1a)
(1) ⑦ ⑧ (2) ⑦ + − ⑧	Output 3 (OUT3) (1) Relay (2) Current, voltage pulse, continuous voltage
(1) ⑨ ⑩ (2) ⑨ + − ⑩	Output 4 (OUT4) (1) Relay (2) Current, voltage pulse
(1) ⑪ ⑫ (2) ⑪ + − ⑫	Output 5 (OUT5) (1) Relay (2) Current, continuous voltage, transmitter power supply

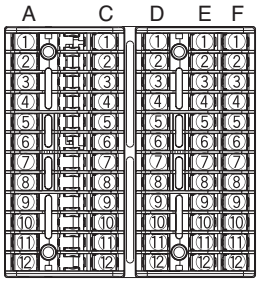
C

Description	
(1) ① C1 ② C2 ③ C3 ④ C4 ⑤ C5 ⑥ C6 ⑦ C7 ⑧ C8 ⑨ (2) ① COM(−) ② C1 ③ C2 ④ C3 ⑤ C4 ⑥ C5 ⑦ C6 ⑧ C7 ⑨ C8 L	Digital input/output (DI/DO) (1)DI (2)DO
DA ⟷ ⑩ DB ⟷ ⑪ SG ⟶ ⑫	RS-485

F

Description	
(1) ① F1 ② F2 ③	Other input (1) Digital input (DI)
④ —	Unused
(1) ⑤ ⑥ − ⑦ + ⑧ (2) A ⑤ ⑥ B ⑦ C ⑧ (3) ⑤ + ⑥ V/mA − ⑦ mV + ⑧	PV input 2 (PV2) (1) Thermocouple (2) Resistance temperature detector (3) DC voltage/ current
(1) ⑨ ⑩ − ⑪ + ⑫ (2) A ⑨ ⑩ B ⑪ C ⑫ (3) ⑨ + ⑩ V/mA − ⑪ mV + ⑫	PV input 1 (PV1) (1) Thermocouple (2) Resistance temperature detector (3) DC voltage/ current

■ SDC46A terminals



A

Description	
(1) ① ② ③	Power supply (1) AC power supply 100 to 240Vac
(1) ④ 1 ⑤ 2 ⑥ / (2) ④ 1 ⑤ 2 ⑥	Output 1, Output 2 (OUT1/OUT2) (1) Relay (1a1b) (2) Relay 2 (1a)
(1) ⑦ ⑧ / (2) ⑦ + ⑧ −	Output 3 (OUT3) (1) Relay (2) Current, voltage pulse, continuous voltage
(1) ⑨ ⑩ / (2) ⑨ + ⑩ −	Output 4 (OUT4) (1) Relay (2) Current, voltage pulse
(1) ⑪ ⑫ / (2) ⑪ + ⑫ −	Output 5 (OUT5) (1) Relay (2) Current, continuous voltage, transmitter power supply

C

Description	
① C1 ② C2 ③ C3 ④ C4 ⑤	Digital input (DI)
⑥ + ⑦ −	Output 6 (OUT 6) Current
⑧ + ⑨ −	Output 7 (OUT 7) Current Transmitter power supply
DA ⑩ DB ⑪ SG ⑫	RS-485

D

Description	
① D1 ② D2 ③ D3 ④ D4 ⑤ D5 ⑥ D6 ⑦ D7 ⑧ D8 ⑨	Digital input (DI)
⑩ —	Unused
—	
—	

E

Description	
① COM(—) ② E1 ③ E2 ④ E3 ⑤ E4 ⑥ E5 ⑦ E6 ⑧ E7 ⑨ E8	Digital output (DO)
⑩ —	Unused
⑪ —	
⑫ —	

F

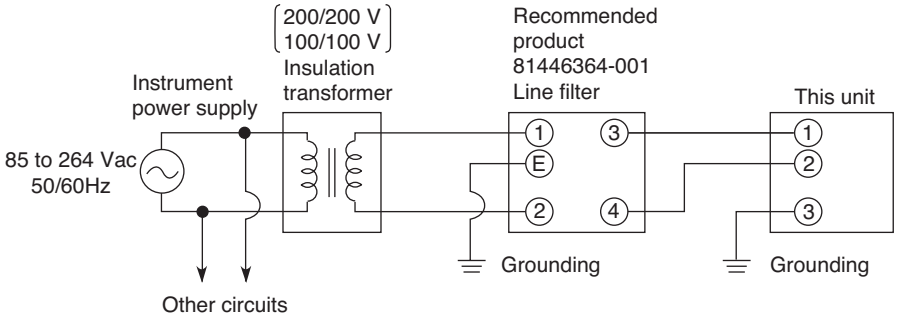
Description	
(1) ① F1 ② F2 ③	Other input (1) Digital input (DI)
④ —	Unused
(1) ⑤ ⑥ − ⑦ + ⑧ / (2) ⑤ A ⑥ B ⑦ C ⑧ / (3) ⑤ ⑥ + V/mA − ⑦ mV + ⑧	PV input 2 (PV2) (1) Thermocouple (2) Resistance temperature detector (3) DC voltage/ current
(1) ⑨ ⑩ − ⑪ + ⑫ / (2) ⑨ A ⑩ B ⑪ C ⑫ / (3) ⑨ ⑩ + V/mA − ⑪ mV + ⑫	PV input 1 (PV1) (1) Thermocouple (2) Resistance temperature detector (3) DC voltage/ current

3 - 5 Power Supply Connections and Grounding

■ Power supply connections

⚠WARNING

Before wiring, removing or mounting the SDC45A/46A, be sure to turn the power OFF. Failure to do so might cause electric shock or device failure.



Handling Precautions

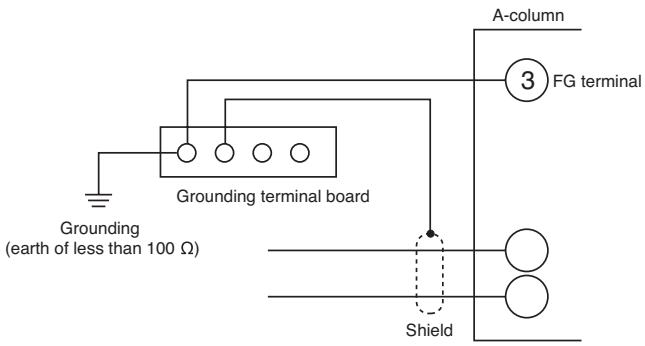
- Obtain the SDC45A/46A power source from a single-phase instrumentation power source not subject to excess noise for AC model.
- If the power source generates noise, add an insulation transformer, and use a line filter.

  Line filter Yamatake Corporation Model No. 81446364-001
- Be careful not to bundle the primary and secondary coils of the power cable together. Do not put them into the same conduit or duct after introducing noise-reduction measures.

■ Grounding

Connect the instrument by one-point grounding to FG terminal (terminal A-(3)). Do not perform any jumper wiring. Mounting a grounding terminal board separately, and connect shielded cables, etc. to the ground, if grounding work is difficult.

Grounding resistance: Less than 100 Ω
Grounding conductor: Annealed copper wire more than 2 mm^2 (AWG14)
Grounding conductor length: 20 m max.



Handling Precautions

- Connect the instrument by one-point grounding to the FG terminal (terminals A-(3)). Do not perform any jumper wiring.

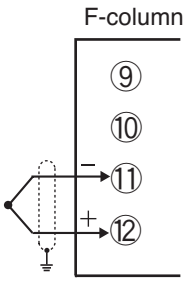
3 - 6 PV Input (PV) Connections

Handling Precautions

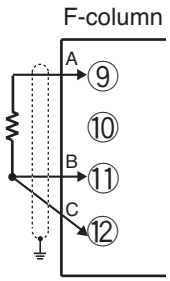
- Do not apply a voltage exceeding the allowable input voltage described in the specifications to each input. Doing so might cause the unit to malfunction.
- Make the connections properly while carefully checking the input polarities.
- Always use shielded wires for input wiring.
- When using a thermocouple for the input, take appropriate measures so that the terminal is not exposed to the wind. Failure to do so might cause an error to occur.

■ PV input 1 (PV1) connection

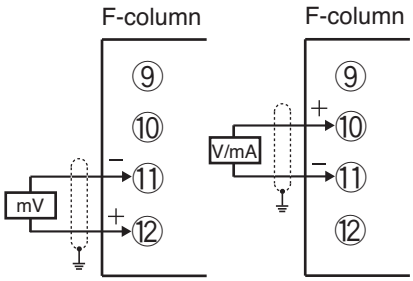
- **Thermocouple sensor**



- **RTD sensor**



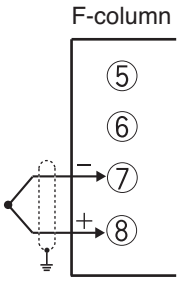
- **Linear voltage/linear current sensor**



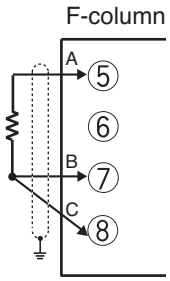
- When the range type is 43 to 46 (0 to 10 mV, -10 to +10 mV, 0 to 100 mV, -100 to +100 mV), terminal Nos. (11) and (12) are used.
- When the range type is 47 to 51 (0 to 1 V, -1 to +1 V, 1 to 5 V, 0 to 5 V, 0 to 10 V), terminal Nos. (10) and (11) are used.

■ PV input 2 (PV2) connection

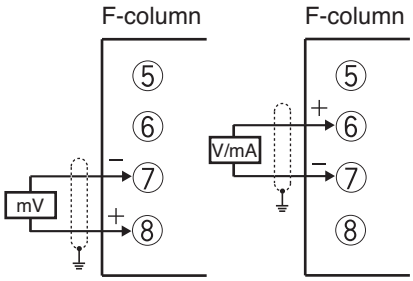
- **Thermocouple sensor**



- **RTD sensor**



- **Linear voltage/linear current sensor**

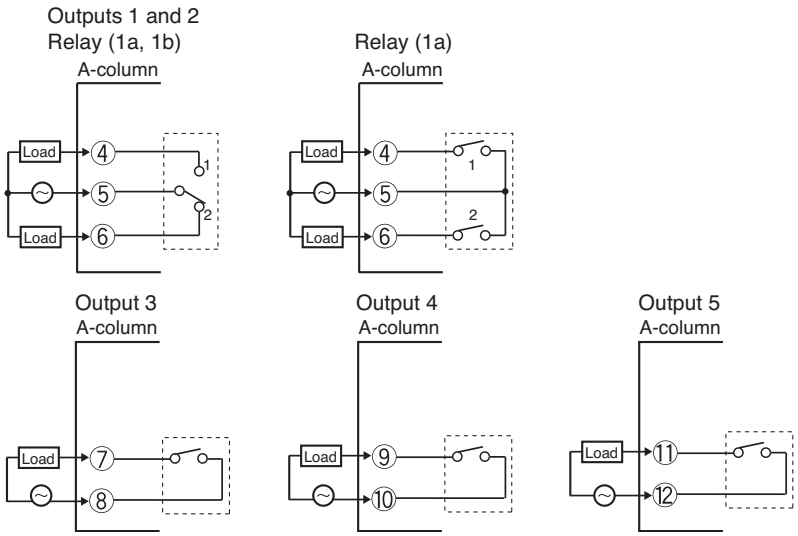


- When the range type is 43 to 46 (0 to 10 mV, -10 to +10 mV, 0 to 100 mV, -100 to +100 mV), terminal Nos. (7) and (8) are used.
- When the range type is 47 to 51 (0 to 1 V, -1 to +1 V, 1 to 5 V, 0 to 5 V, 0 to 10 V), terminal Nos. (6) and (7) are used.

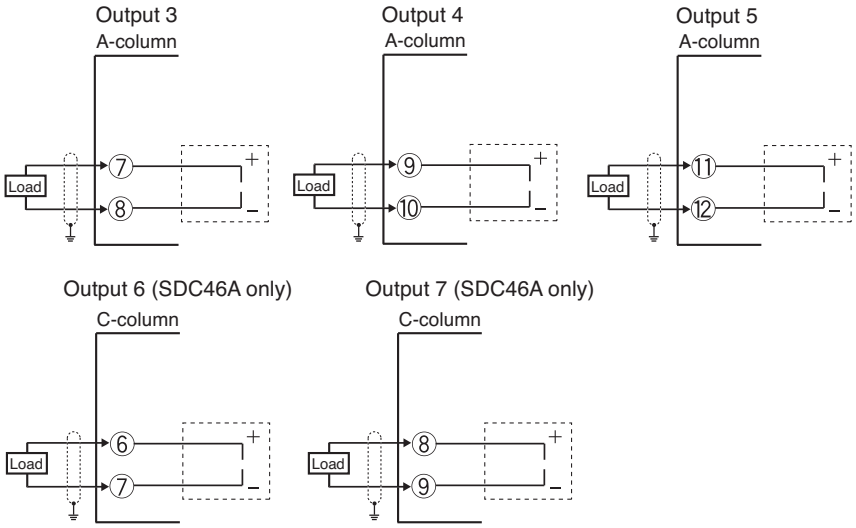
3 - 7 Output (OUT) Connections

The terminal assignment may vary depending on the model No. Make the connections properly while carefully checking the model No. and terminal No.
For details about terminal No. assignment, refer to:
☞ 3-4 Terminal Wiring Diagram (on page 3-5).

■ Relay output



■ Current output, continuous voltage output, voltage pulse output, and power supply for transmitter



! Handling Precautions

- When opening or closing a micro current, use a bleeder resistance corresponding to the minimum open/close capacity of the relay to adjust it to a sufficient current level.
- Do not connect or disconnect a load with the power to this unit turned ON. Doing so might cause this unit or load to be faulty.
- Always use shielded wires to connect the current output or continuous voltage output.

■ Connection with solid state relay (SSR)

To drive the SSR, a model having voltage pulse outputs must be used.
A constant current type SSR must be used. The following describes how to connect the SSR.
The two conditions listed below must be satisfied.

- Input current (maximum): When the load current of the voltage pulse output is satisfied, parallel connection can be made.
- Operating voltage range (input): Check that the voltage between the terminals of the voltage pulse output is within the specified range.

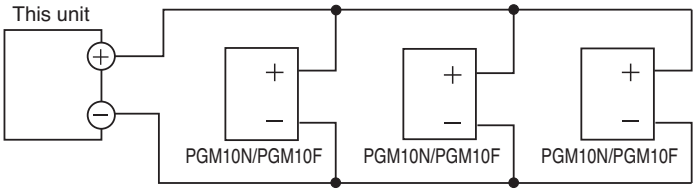
● Yamatake's PGM10N/PGM10F series

This example shows the calculation for the connection of this unit and the PGM10N015.
Note: For connection with other model number, check the specifications of each model.

- Input current: Since the input current is 10 mA or less, up to three units (10 mA × 3 = 30 mA ≤ 30 mA [maximum load current]) can be connected in parallel.
- Operating voltage range (input): The rated voltage is 3.5 to 30 Vdc. Therefore, the output voltage is within the range.

Output voltage = 12 Vdc $^{+15\%}_{-10\%}$

Connection diagram



Number of connectable units

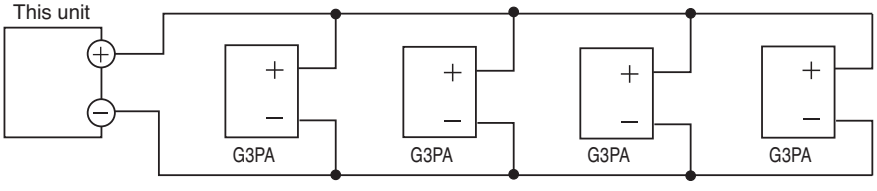
SSR	Connection	Number of connected units per output
PGM10N	Parallel connection	Up to 3 units
PGM10F	Parallel connection	Up to 2 units

● Omron's G3PA, G3PB, G3NA

- Input current: Since the input current is 7 mA or less, up to four units (7 mA × 4 = 28 mA ≤ 30 mA [maximum allowable current]) can be connected in parallel.
- Operating voltage range (input): The operating voltage is 4 to 30 (32) Vdc or 9.6 to 30Vdc. Therefore, the output voltage is within the range.

Output voltage = 12 Vdc $^{+15\%}_{-10\%}$

Connection diagram



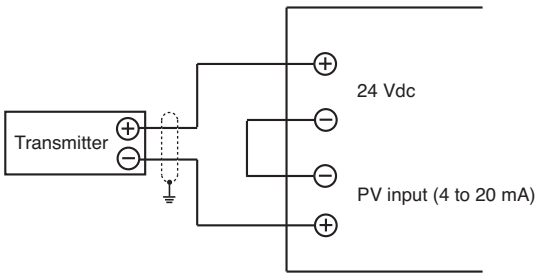
Number of connectable units

SSR	Connection	Number of connected units per output
Omron G3PA	Parallel connection	Up to 4 units
Omron G3PB	Parallel connection	Up to 4 units
Omron G3NA	Parallel connection	Up to 4 units

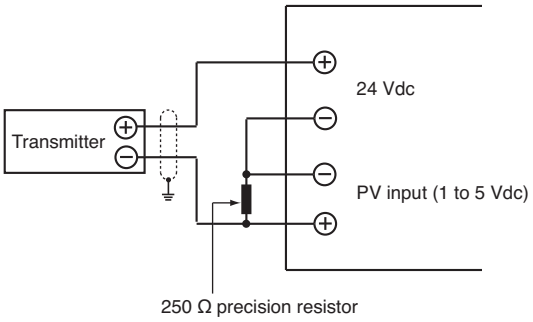
■ Connection with transmitter (4 to 20 mAdc output)

When this unit is used for the power supply of the transmitter (4 to 20 mAdc output), use a model, the output of which has the power supply for the transmitter.

● Current input



● Voltage input

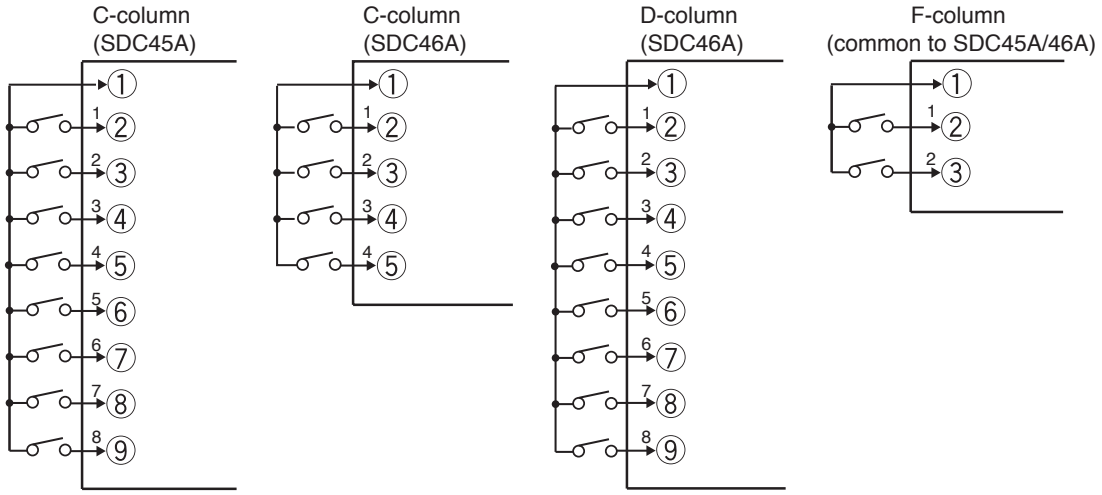


! Handling Precautions

- The power supply for the transmitter always outputs the voltage at the same time when the power to this unit is turned ON.
  Therefore, carefully check the connections before turning ON the power to this unit.
  Additionally, do not connect or disconnect the transmitter with the power to this unit turned ON. Doing so might cause the transmitter to malfunction.
- Always use shielded wires for wiring.

3 - 8 Digital Input (DI) Connections

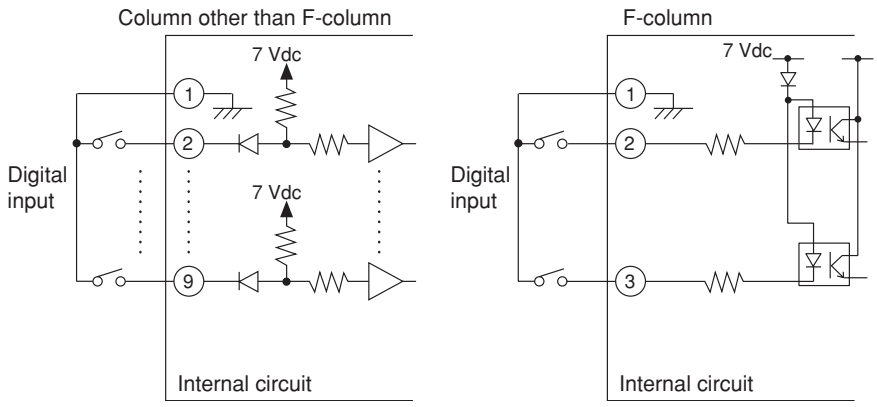
The terminal assignment may vary depending on the model No. Make the connections properly while carefully checking the model No. and terminal No.
For details about terminal No. assignment, refer to:
☞ 3-4 Terminal Wiring Diagram (on page 3-5).



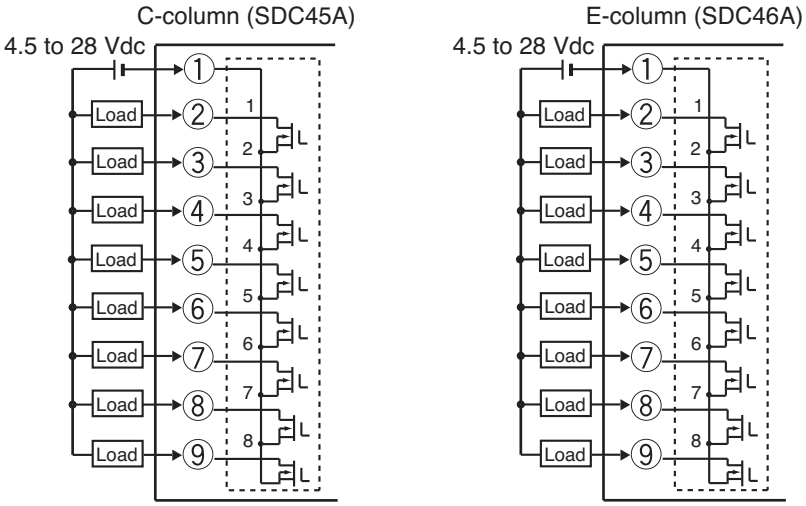
! Handling Precautions

- The digital input of this unit is a type of built-in power supply. Always use dry contacts for external contacts.
- For dry contacts, always use a gold contact or other contact that can turn ON or OFF the micro current. When using other relay contacts, the relay contact may not be turned ON or OFF. Always use a contact having a sufficient allowance of the minimum open/close capacity to the short-circuit terminal current and open-terminal voltage of this unit.
- If a semiconductor (open collector, etc.) is used for dry contact, use an appropriate semiconductor that the voltage across the contact at both ends when the contact is turned ON satisfies the allowable ON drop voltage. Additionally, use an appropriate semiconductor that the leak current when the contact is turned OFF satisfies the allowable OFF leak current.

Internal circuit diagram of this unit to be connected to external switch input



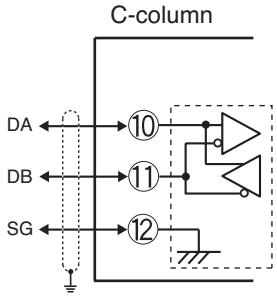
3 - 9 Digital Output (DO) Connections



! Handling Precautions

- Do not make the positive (+) terminal of the external power supply short-circuited with terminals (2) to (9) of C-column (SDC45A) or E-column (SDC46A). If the positive (+) terminal is short-circuited with above terminals, this might cause the digital output to malfunction. (A short-circuit protection circuit is not incorporated.)
- When connecting a semiconductor load, such as program controller (sequencer), always select an appropriate module having the same current direction.
  Additionally, do not use any semiconductor load, which is not operated by the leak current when the digital output of this unit is turned OFF.

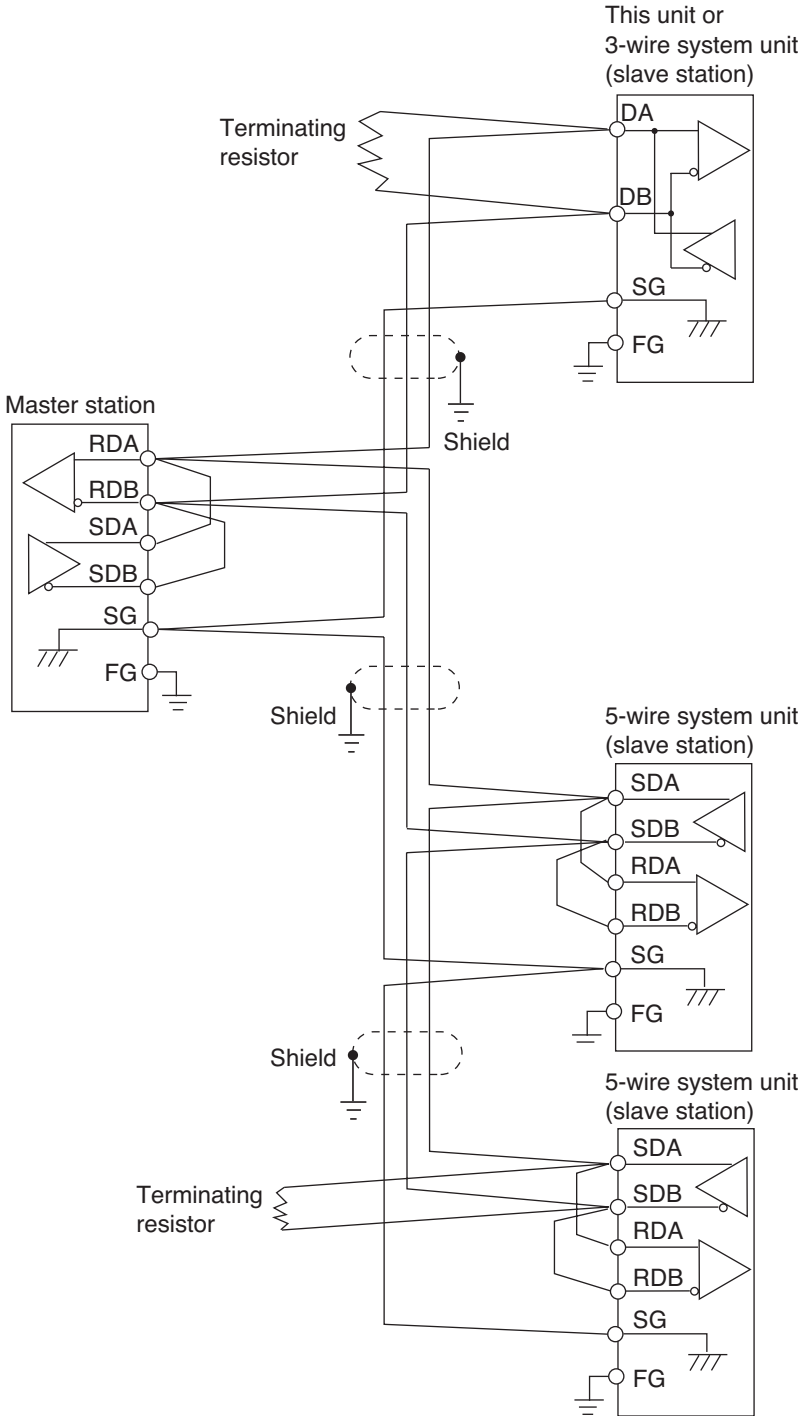
3 - 10 RS-485 Communication Connections



Handling Precautions

- Be sure to connect the SG terminals each other. Failure to do so might cause unstable communications.
- Attach 0.5 W or greater terminating resistor of 150 Ω ± 5 % at each end of the communications lines.
- If units for which the connection of a terminating resistor is prohibited (Yamatake SDC15/25/26/35/36 or DMC10) are on the same transmission line, do not connect a terminating resistor.
- Ground the shield FGs at one end in one location, not at both ends.

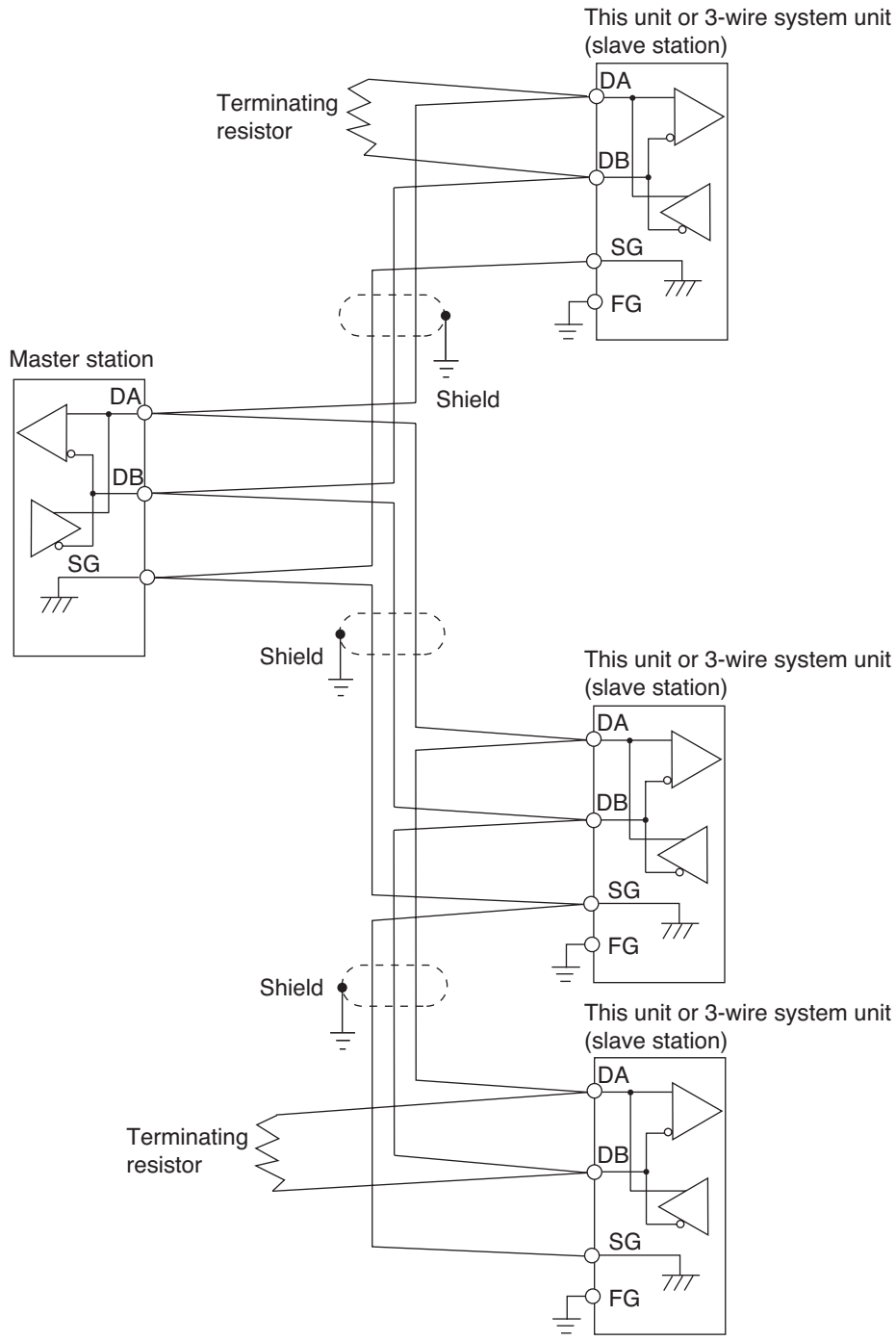
● **Multiple 5-wire system units together**



! Handling Precautions

- If units for which the connection of a terminating resistor is prohibited (Yamatake SDC15/25/26/35/36 or DMC10) are on the same transmission line, do not connect a terminating resistor.

● **3-wire system**



! Handling Precautions

- If units for which the connection of a terminating resistor is prohibited (Yamatake SDC15/25/26/35/36 or DMC10) are on the same transmission line, do not connect a terminating resistor.

3 - 11 Noise Generation Sources and Noise Suppression

Generally, it is thought that the following may be noise generation sources:

1. Relay and contacts
2. Solenoid coils and solenoid valves
3. Power line (higher than 90 Vac, in particular)
4. Inductive load
5. Motor commutator
6. Phase angle control SCR
7. Radio communication equipment
8. Welding machine
9. High-voltage ignition devices

The following shows effective measures for noise suppression:

1. A CR filter is effective for quick-rising noises such as impulse noise.
   Recommended CR filter: Yamatake Corporation Model No. 81446365-001
2. A varistor is effective for noises with high crest values.
   Be careful since the varistor is shorted if it malfunctions.

   Recommended varistor

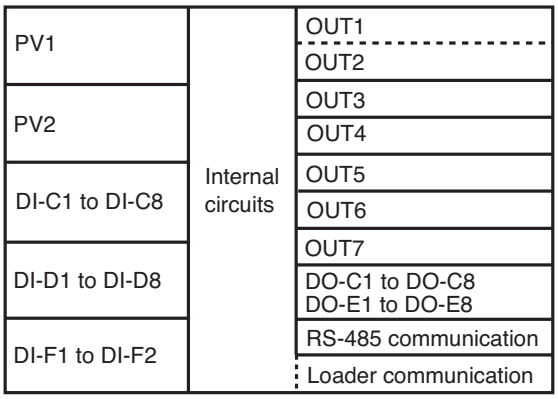
   Yamatake Corporation Model No. : 81446366-001 (for 100 V)
   81446367-001 (for 200 V)

! Handling Precautions

- Take great care when using a varistor since the varistor becomes short-circuited if it is faulty.

3 - 12 I/O Isolation

The following figure shows the mutual isolation between the input and output. In the following figure, sections bounded by a solid line are isolated from the rest of the circuit. Sections bounded by a dotted line are not isolated from the rest of the circuit.



The power circuit is isolated from all inputs/outputs, communications and internal circuits.

Handling Precautions

- The loader jack is not isolated from the internal circuits. Always put the cap on the loader jack when the loader is not used.

Flowcharts for Major Settings

Chapters 4 to 7 describe the data settings of this unit.
To properly operate this unit, be sure to set each setting data correctly so that it meets the operation of this unit.

When operating this unit for the first time, configure the settings in the order shown below.

1. Setting of PARA bank
2. Setting of SP/EV bank

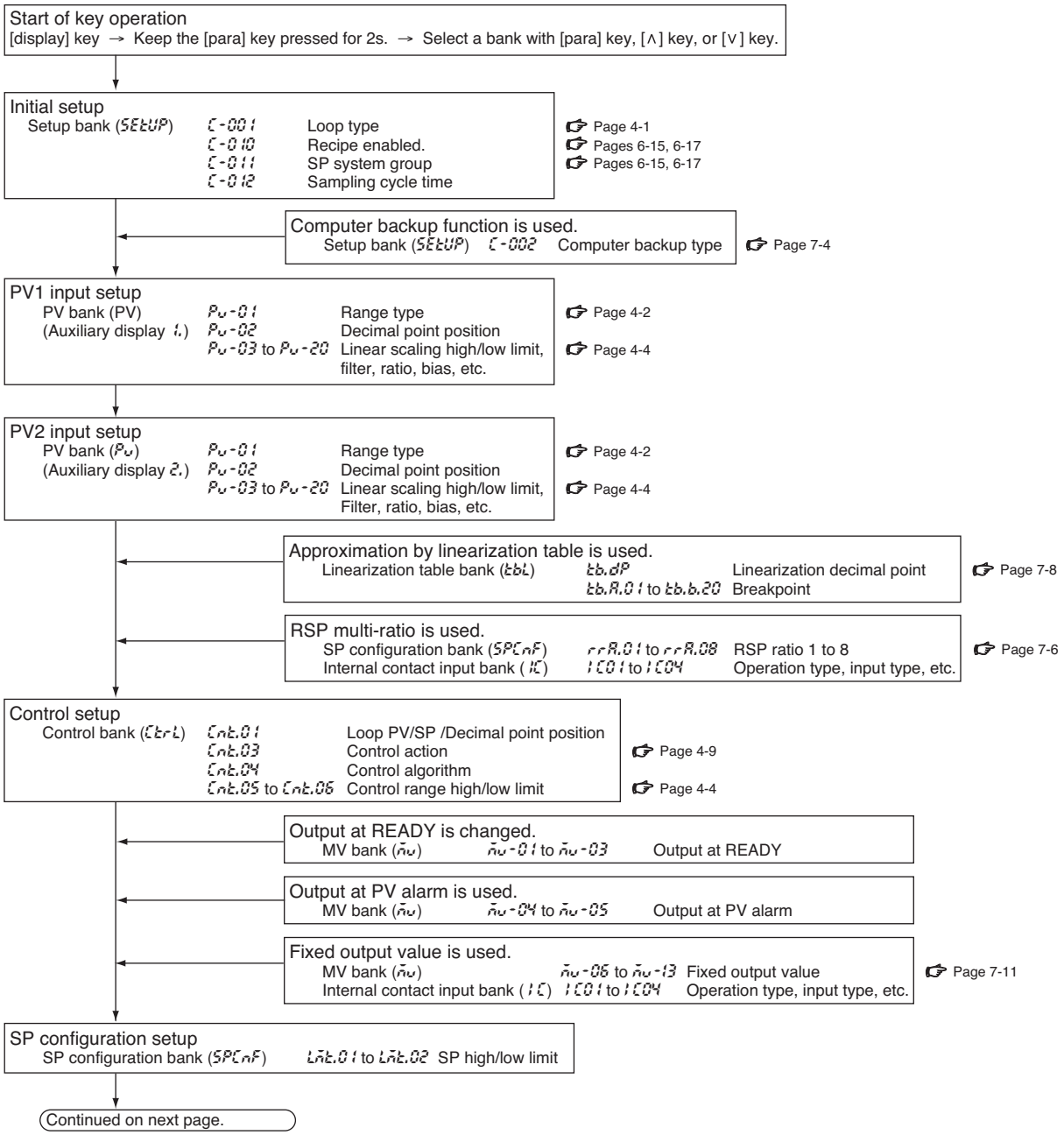
For details about data setting order in each setup, see the setting fowcharts on the following pages:

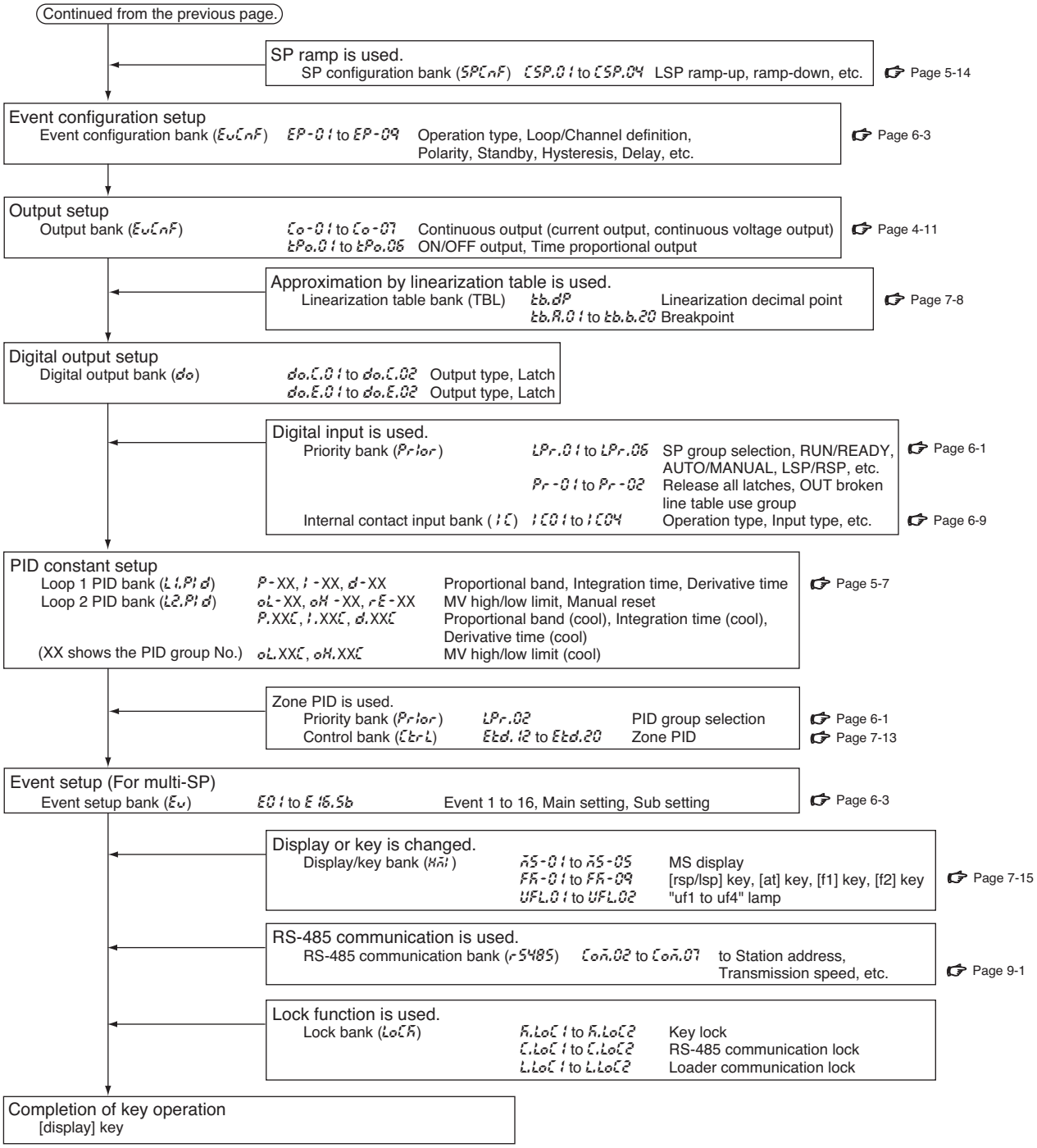
1. Setting of PARA bank

● Key operations when setting or changing PARA bank

(1) Press the [display] key to return to the operation display.
(2) To select a bank, keep the [para] key pressed for 2 s.
(3) To display a bank to be set, press the [para] key, [∧] key, or [∨] key.
(4) When a desired bank is displayed, press the [enter] key.
(5) To display an item to be set, press the [para] key, [∧] key, [∨] key, [<] key, or [>] key.
(6) When a desired item is displayed, press the [enter] key.
(7) Change the set value with the [∧] key, [∨] key, [<] key, or [>] key.
(8) To set the set value you have changed, press the [enter] key.
(9) To set other items in the same bank, repeat the operation from step (5).
To set desired set data in other bank, continue the operation from step (2).
(10) To exit the setting, press the [display] key.

● Setting and operation flow




Continued from the previous page.
SP ramp is used.
SP configuration bank (SPCnF) CSP.01 to CSP.04 LSP ramp-up, ramp-down, etc.
Page 5-14
Event configuration setup
Event configuration bank (EvCnF) EP-01 to EP-09 Operation type, Loop/Channel definition, Polarity, Standby, Hysteresis, Delay, etc.
Page 6-3
Output setup
Output bank (EvCnF) Co-01 to Co-07 Continuous output (current output, continuous voltage output)
tPo.01 to tPo.06 ON/OFF output, Time proportional output
Page 4-11
Approximation by linearization table is used.
Linearization table bank (TBL) tb.dP Linearization decimal point
tb.A.01 to tb.b.20 Breakpoint
Page 7-8
Digital output setup
Digital output bank (do) do.C.01 to do.C.02 Output type, Latch
do.E.01 to do.E.02 Output type, Latch
Digital input is used.
Priority bank (Prior) LPr.01 to LPr.06 SP group selection, RUN/READY, AUTO/MANUAL, LSP/RSP, etc.
Page 6-1
Pr-01 to Pr-02 Release all latches, OUT broken line table use group
Internal contact input bank (IC) IC01 to IC04 Operation type, Input type, etc.
Page 6-9
PID constant setup
Loop 1 PID bank (L1.PId) P-XX, I-XX, d-XX Proportional band, Integration time, Derivative time
Page 5-7
Loop 2 PID bank (L2.PId) oL-XX, oH-XX, rE-XX MV high/low limit, Manual reset
P.XXC, I.XXC, d.XXC Proportional band (cool), Integration time (cool), Derivative time (cool)
(XX shows the PID group No.) oL.XXC, oH.XXC MV high/low limit (cool)
Zone PID is used.
Priority bank (Prior) LPr.02 PID group selection
Page 6-1
Control bank (CtrL) Etd.12 to Etd.20 Zone PID
Page 7-13
Event setup (For multi-SP)
Event setup bank (Ev) E01 to E16.5b Event 1 to 16, Main setting, Sub setting
Page 6-3
Display or key is changed.
Display/key bank (Hdi) dS-01 to dS-05 MS display
FK-01 to FK-09 [rsp/lsp] key, [at] key, [f1] key, [f2] key
Page 7-15
UFL.01 to UFL.02 "uf1 to uf4" lamp
RS-485 communication is used.
RS-485 communication bank (rS485) Com.02 to Com.07 to Station address, Transmission speed, etc.
Page 9-1
Lock function is used.
Lock bank (LoCK) K.LoC1 to K.LoC2 Key lock
C.LoC1 to C.LoC2 RS-485 communication lock
L.LoC1 to L.LoC2 Loader communication lock
Completion of key operation
[display] key

2. Setting of SP/EV bank

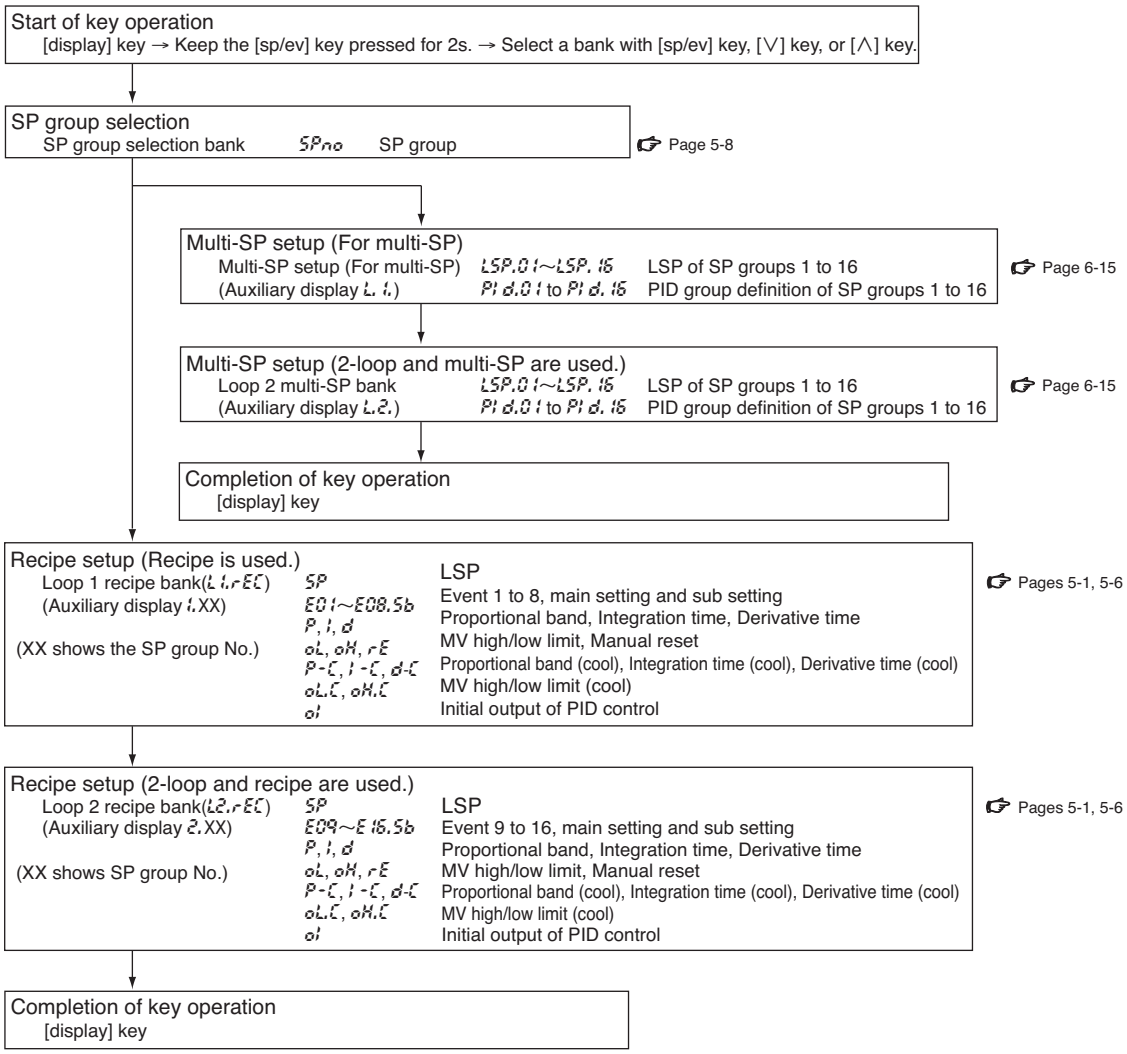
● Key operations when setting or changing SP/EV bank

(1) Press the [display] key to return to the operation display.
(2) To select a bank, keep the [sp/ev] key pressed for 2 s.
(3) To display a bank to be set, press the [sp/ev] key, [∧] key, or [∨] key.
(4) When a desired bank is displayed, press the [enter] key.
(5) To display an item to be set, press the [sp/ev] key, [∧] key, [∨] key, [<] key, or [>] key.
(6) When a desired item is displayed, press the [enter] key.
(7) Change the set value with the [∧] key, [∨] key, [<] key, or [>] key.
(8) To set the set value you have changed, press the [enter] key.
(9) To set other items in the same bank, repeat the operation from step (5).

To set desired set data in other bank, continue the operation from step (2).

(10) To exit the setting, press the [display] key.

● Setting and operation flow



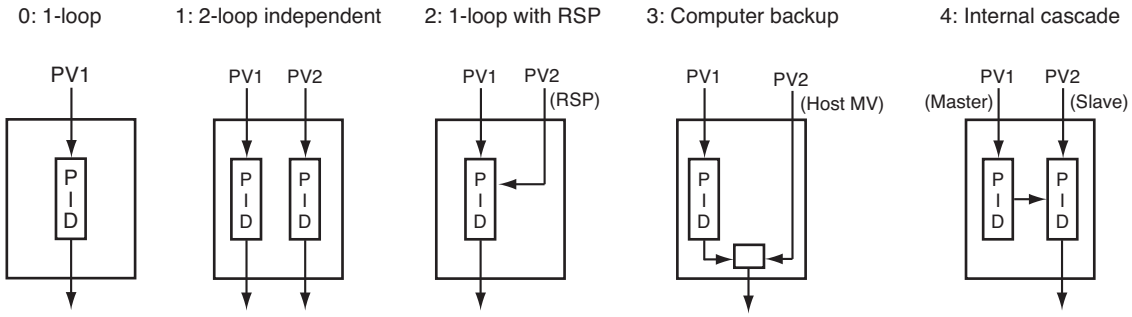
Chapter 4. FUNCTIONS NECESSARY FOR CONTROL

4 - 1 How to Set the Loop Type (2-input Model)

In the 2-input model, a desired loop type (control method) is selected by the settings.

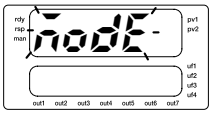
■ Bank and settings

Bank	Item display	Item name	Settings
SEtUP	C-001	Loop type	0: 1-loop, 1: 2-loop independent, 2: 1-loop with RSP, 3: Computer backup, 4: Internal cascade

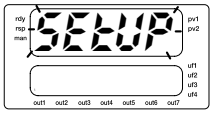


■ Setting procedures

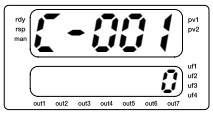
(1) Keep the [para] key pressed for 2 s in the operation display status.
>> nodE is flashing on the upper display.



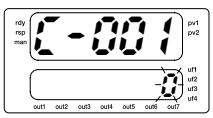
(2) Press the [∨] key or [para] key several times until SEtUP is shown on the upper display.
>> SEtUP is flashing on the upper display.



(3) Press the [enter] key.
>> C-001 is shown on the upper display.



(4) Press the [enter] key.
>> The value on the lower display starts flashing.



(5) Set a desired value with the [∨] key or [∧] key.

(6) Press the [enter] key to set the value.

(7) When the setting has been completed, press the [display] key.
>> The operation is then returned to the operation display status.

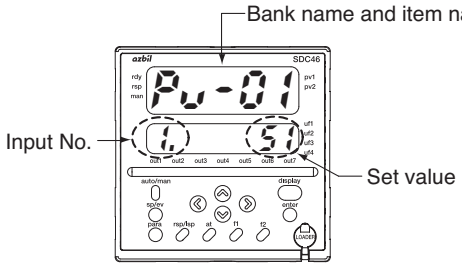
4 - 2 How to Set the Input Type

The input of this unit is a full-multi input method. The setting data is set properly according to the type of the signal to be connected.

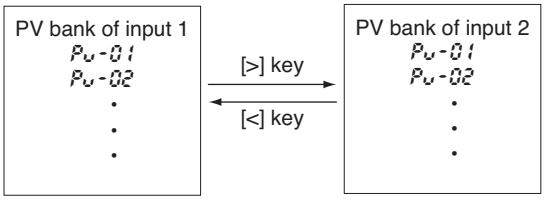
■ Bank and settings

Bank	Item display	Item name	Settings
Pv	Pv-01	Range type	See the list of input types shown on the next page.

■ Description of display



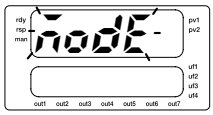
The input No. can be changed with the [<] key or [>] key. (For 2-input model)



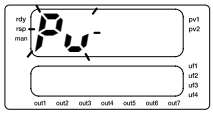
■ Setting procedures

● PV input bank

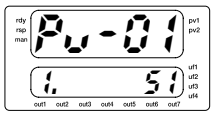
(1) Keep the [para] key pressed for 2s in the operation display status.
>> mode is flashing on the upper display.



(2) Press the [∨] key or [para] key several times until Pv is shown on the upper display.
>> Pv is flashing on the upper display.



(3) Press the [enter] key.
>> Pv-01 is shown on the upper display. At this time, check that 1. is shown on the auxiliary display.
(To set input 2, change the value with the [>] key or [<] key.)



(4) Press the [enter] key.
>> The value on the lower display starts flashing.

(5) Set a desired value with the [∨] key or [∧] key.

(6) Press the [enter] key to set the value.

(7) When the setting has been completed, press the [display] key.
>> The operation is then returned to the operation display status.

■ Input types

The input indication accuracy may vary depending on the type of sensor.
For details, refer to:
☞ Chapter 13, Specifications.

● Thermocouple

Pv-01 set value	Sensor type	Range	
1	K	-270.0 to +1372.0 °C	-454 to +2502 °F
2	E	-270.0 to +1000.0 °C	-454 to +1832 °F
3	J	-200.0 to +1200.0 °C	-328 to +2192 °F
4	T	-270.0 to +400.0 °C	-454 to +752 °F
5	B	0.0 to 1800.0 °C	32 to 3272 °F
6	R	-50.0 to +1768.0 °C	-58 to +3214 °F
7	S	-50.0 to +1768.0 °C	-58 to +3214 °F
8	WRe5-26	0.0 to 2300.0 °C	32 to 4172 °F
9	PR40-20	0.0 to 1900.0 °C	32 to 3452 °F
10	Ni-Ni·Mo	0.0 to 1300.0 °C	32 to 2372 °F
11	N	-200.0 to +1300.0 °C	-328 to +2372 °F
12	PL II	0.0 to 1390.0 °C	32 to 2534 °F
13	DIN U	-200.0 to +600.0 °C	-328 to +1112 °F
14	DIN L	-200.0 to +900.0 °C	-328 to +1652 °F
15	Gold-iron/chromel	-273.0 to +27.0 °C	-459 to +80 °F

● Resistance temperature detector (RTD)

Pv-01 set value	Sensor type	Range	
21	Pt100	-200.0 to +850.0 °C	-328.0 to +1562.0 °F
22		-200.00 to +300.00 °C	-328.00 to +572.00 °F
31	JPt100	-200.0 to +640.0 °C	-328.0 to +1184.0 °F
32		-200.00 to +300.00 °C	-328.00 to +572.00 °F

● DC voltage/DC current

Pv-01 set value	Sensor type	Range
41	Current	4 to 20 mA
42		0 to 20 mA
43	Voltage	0 to 10 mV
44		-10 to +10 mV
45		0 to 100 mV
46		-100 to +100 mV
47		0 to 1 V
48		-1 to +1 V
49		1 to 5 V
50		0 to 5 V
51		0 to 10 V

4 - 3 How to Set Range-Related Items

Each range is set corresponding to the input type set in section 4-2, How to set an input type (on page 4-2).

■ Bank and settings

Bank	Item display	Item name	Settings
CtrL	CnL.05	Range low limit for control	Low limit of range used for PID control * This item must be set.
	CnL.06	Range high limit for control	High limit of range used for PID control * This item must be set.
Pu	Pu-04	Range low limit	Under-range is detected by the PV below this value.
	Pu-05	Range high limit	Over-range is detected by the PV exceeding this value.
	Pu-09	Linear scaling low limit	Value when the low limit of the linear signal is input. * This item must be set when the linear input is selected.
	Pu-10	Linear scaling high limit	Value when the high limit of the linear signal is input. * This item must be set when the linear input is selected.

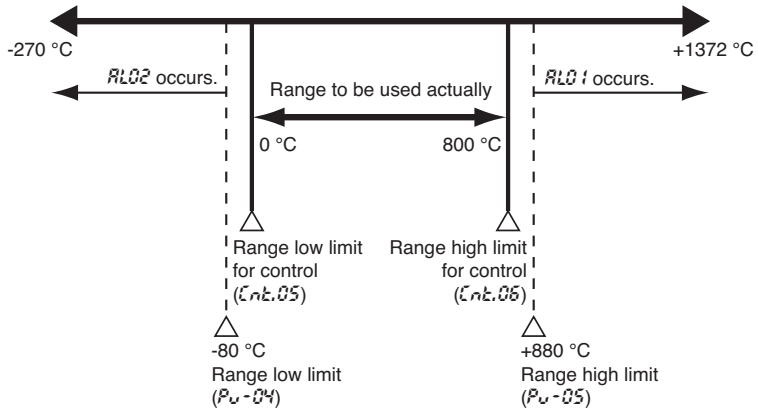
■ Range setup

This unit has one range for each input signal type.

Example: K thermocouple input: -270 to +1372 °C

Each range is set at the maximum range value, which can be input. Therefore, to operate this unit at its optimal operating level, it is recommended to properly set each range after the input type has been selected.

Assuming that the range K of the selected input uses 0 to 800 °C and the range of the input alarm uses -10 to +110 %,



■ Setting procedures

● Control bank (CtrL) (Range width for control)

Handling Precautions

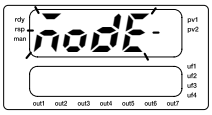
- The range for control is a setting data related to the PID control. This range affects the results of the auto tuning. Therefore, this range must be set.

Set the full scale of the input range width to be used for actual operation as high and low limit values.

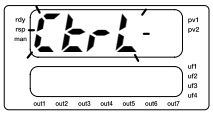
Example: The K thermocouple uses a range of 0.0 to 800.0 °C

Bank	Item display	Item name	Settings
CtrL	CnL.05	Range low limit for control	0.0
	CnL.06	Range high limit for control	800.0

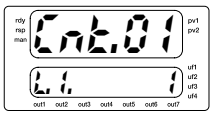
(1) Keep the [para] key pressed for 2 s in the operation display status.
>> mode is flashing on the upper display.



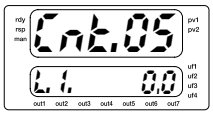
(2) Press the [∨] key or [para] key several times until Ctrl is shown on the upper display.
>> Ctrl is flashing on the upper display.



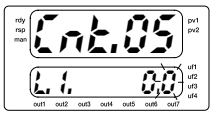
(3) Press the [enter] key.
>> Cnt.01 is shown on the upper display.



(4) Press the the [∨] key key several times until Cnt.05 is shown on the upper display.
>> Cnt.05 is shown on the upper display.



(5) Press the [enter] key.
>> The value on the lower display starts flashing.



(6) Set at 0.0 with the [∨] key or [∧] key.

(7) Press the [enter] key to set the value.

(8) In the same manner, return with the the [∨] key or [∧] key. Repeat the steps (4) to (7) to configure the settings for Cnt.06.

(9) When all settings have been completed, press the [display] key.
>> The operation is returned to the operation display status.

● Features of this setting

As the range width for control is set, it is not necessary to readjust the PID even when the setting is changed as described below.

- The input type is changed (K thermocouple → R thermocouple).
- The linear range (engineering range) is changed (0.0 to 5.0 kPa → 0.0 to 0.75 kPa).

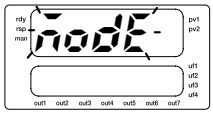
● PV bank (high and low limits of linear range)

The high and low limits of the linear range need to be set when the DC voltage or DC current is selected for the input type. Input high and low limit values corresponding to the output range (engineering range) of the connected unit.

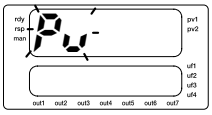
Example: Setting when the pressure transmitter is connected (Pv-01 41: 4 to 20 mA is selected)

Specifications of transmitter		Setting of this unit		
Output signal	Output range	Item display	Item name	Settings
4 mA DC	0.0 kPa	Pv-09	Linear scaling low limit	0.0
20 mA DC	10.0 kPa	Pv-10	Linear scaling high limit	10.0

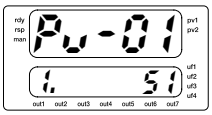
(1) Keep the [para] key pressed for 2 s in the operation display status.
>> mode is flashing on the upper display.



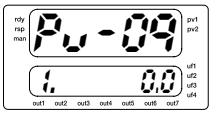
(2) Press the [∨] key or [para] key several times until Pv is shown on the upper display.
>> Pv is flashing on the upper display.



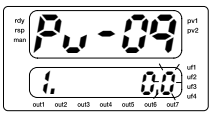
(3) Press the [enter] key.
>> Pv-01 is shown on the upper display. At this time, check that 1. is shown on the auxiliary display.
(To set input 2, change the value with the [>] key or [<] key.)



(4) Press the [∨] key several times until Pv-09 is shown on the upper display.
>> Pv-09 is shown on the upper display.



(5) Press the [enter] key.
>> The value on the lower display starts flashing.



(6) Set at 0.0 with the [∨] key or [∧] key.

(7) Press the [enter] key to set the value.

(8) In the same manner, return with the [∨] key or [∧] key. Repeat the steps (4) to (7) to configure the settings for Pu-10.

(9) When the setting has been completed, press the [display] key.
>> The operation is returned to the operation display status.

● PV bank (Pu) (High and low limits of PV range)

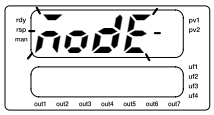
PV range is set when a desired under range or over range to the selected input type needs to be detected.

This unit detects an input error even in the initial setting status. However, it is recommended to set a PV range corresponding to the range area to be used actually.

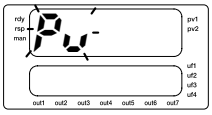
Example: Setting to detect a level which is 10 % or less of the low limit and a level which is +10 % or more of the high limit as an input error. (Pu-01 1:K (-270.0 to +1372.0 °C) is selected.)

Range to be used		Setting of this unit		
		Item display	Item name	Settings
Low limit	0.0 °C	Pu-04	Range low limit	-80.0
High limit	800.0 °C	Pu-05	Range high limit	+880.0

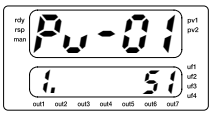
(1) Keep the [para] key pressed for 2 s in the operation display status.
>> nodE is flashing on the upper display.



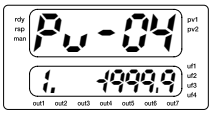
(2) Press the [∨] key or [para] key several times until Pu is shown on the upper display.
>> Pu is flashing on the upper display.



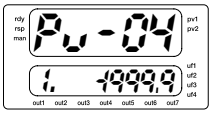
(3) Press the [enter] key.
>> Pu-01 is shown on the upper display. At this time, check that 1. is shown on the auxiliary display.
(To set input 2, change the value with the [>] key or [<] key.)



(4) Press the [∨] key several times until Pu-04 is shown on the upper display.
>> Pu-04 is shown on the upper display.



(5) Press the [enter] key.
>> The value on the lower display starts flashing.



(6) Set to (80.0 with the the [∨] key or [∧] key.

(7) Press the [enter] key to set the value.

(8) In the same manner, return with the [∨] key or [∧] key. Repeat the steps (4) to (7) to configure the settings for Pv-05.

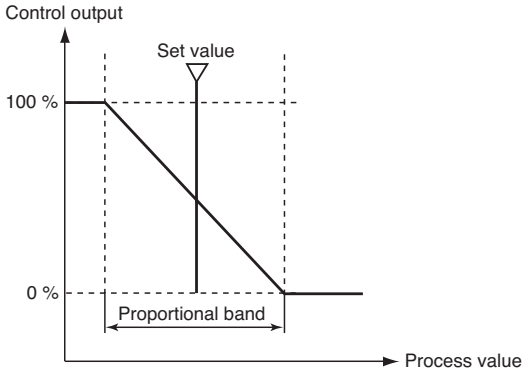
(9) When the setting has been completed, press the [display] key.
>> The operation is returned to the operation display status.

4 - 4 How to Set the Loop Control Action

The basic operation of the PID control is set.

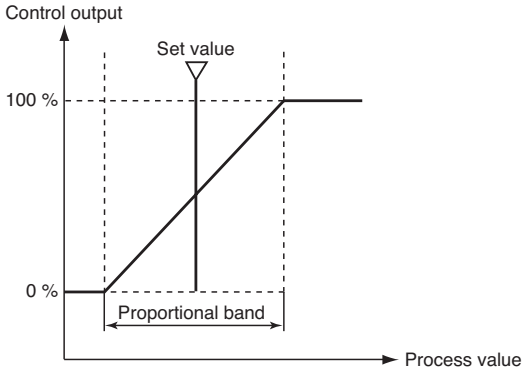
Heat action: Reverse action.

Control output decreases as the process value increases. Generally, this action is used for heating control.

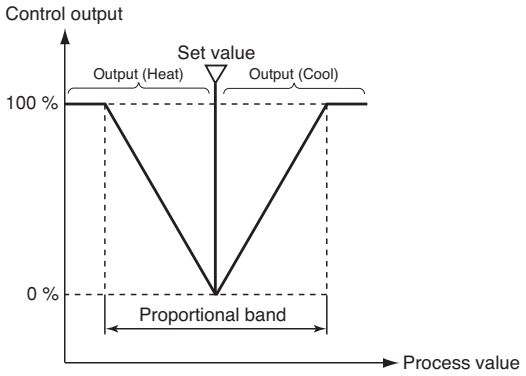


Cool action: Direct action.

Control output increases as the process value increases. Generally, this action is used for cooling control.



Heat/Cool action

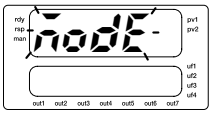


■ Bank and settings

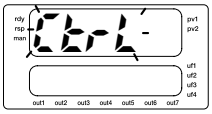
Bank	Item display	Item name	Settings
CtrL	Cnt.03	Control action	0: Reverse action (heat), 1: Direct action (cool), 2: Heat/Cool

■ Setting procedures

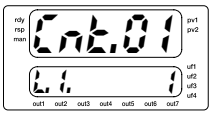
(1) Keep the [para] key pressed for 2 s in the operation display status.
>> modE is flashing on the upper display.



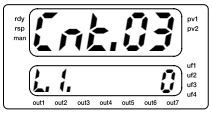
(2) Press the [∨] key or [para] key several times until CtrL is shown on the upper display.
>> CtrL is flashing on the upper display.



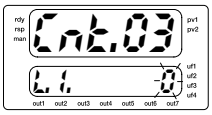
(3) Press the [enter] key.
>> Cnt.01 is shown on the upper display.



(4) Press the [∨] key several times until Cnt.03 is shown on the upper display.
>> Cnt.03 is shown on the upper display.



(5) Press the [enter] key.
>> The value on the lower display starts flashing.



(6) Set a desired value with the [∨] key or [∧] key.

(7) Press the [enter] key to set the value.

(8) Press the [display] key.
>> The operation is returned to the operation display status.

4 - 5 How to Set Outputs (continuous output and time proportional output)

Up to seven output points can be mounted on the SDC46A while up to five points can be mounted on the SDC45A. Setup items of each setting may vary depending on the type of output and operation method.

■ Output types, applications, and settings

Output No.	Output type (Set by model No.)	Application	Bank	Item display
1 to 2	Relay	Time proportional output (MV) Alarm output (EV)	oUt	tPo.01 to 06
3 to 7	Relay Voltage pulse	Time proportional output (MV) Alarm output (EV)		
	Current Continuous voltage	Continuous output (MV) Transmission output (PV, SP, etc.)		Co-01 to 07
	Power supply for transmitter	24 Vdc power supply	None	-

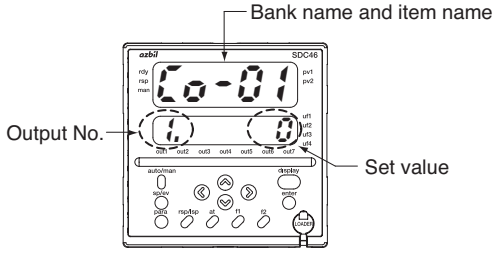
■ Bank and settings

Bank	Item display	Item name	Settings
oUt (Continuous output)	Co-01	Output range	Current output, 0: 4 to 20 mA, 1: 0 to 20 mA Continuous voltage output, 0: 1 to 5 V, 1: 0 to 5 V, 2: 0 to 10 V
	Co-02	Output type	0: Fixed at 0%, 1: MV, 2: Heat MV (for heat/cool control), 3: Cool MV (for heat/cool control), 4: PV (Loop), 5: SP, 6: Deviation (PV-SP), 7: PV (input channel) For others, see the list of standard numeric values (on page App.-15).
	Co-03	Loop/channel definition	0: Invalid, 1: Loop 1/Channel 1, 2: Loop 2/Channel 2
	Co-04	Output decimal position	0: No decimal point, 1: One digit below the decimal point, 2: Two digits below the decimal point, 3: Three digits below the decimal point, 4: Four digits below the decimal point
	Co-05	Low limit of output scaling	-19999 to +32000 U (Value assigned to the low limit of the output)
	Co-06	High limit of output scaling	-19999 to +32000 U (Value assigned to the high limit of the output)
	Co-07	Linearization table group definition	0: Not used., 1: 1 group, 2: 2 groups, 3: 3 groups, 4: 4 groups, 5: 5 groups, 6: 6 groups, 7: 7 groups, 8: 8 groups
oUt (ON/OFF output)	tPo.01	Output type	0: OFF, 1: MV of loop 1, 2: Heat MV of loop 1 (for heat/cool control), 3: Cool MV of loop 1 (for heat/cool control), 4: MV of loop 2 5: Heat MV of loop 2 (for heat/cool control), 6: Cool MV of loop 2 (for heat/cool control) For others, see the list of standard bit Nos. (on page App.-14).
	tPo.02	Latch	0: Not latched., 1: Latched when turned ON., 2: Latched when turned OFF. (Except for OFF when power is turned ON.)
	tPo.03	Time proportional operation type	0: Priority on controllability, 1: Priority on device life
	tPo.04	Min. ON/OFF time	0 to 300 ms
	tPo.05	Time proportional cycle	Relay output, 5.0 to 120.0 s Voltage pulse output, 0.1 to 120.0 s
	tPo.06	Linearization table group definition	0: Not used., 1: group 1, 2: group 2, 3: group 3, 4: group 4, 5: group 5, 6: group 6, 7: group 7, 8: group 8

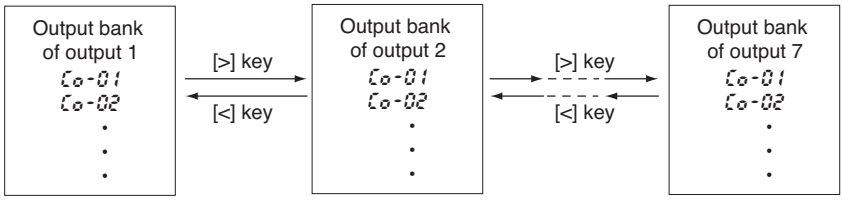
! Handling Precautions

- Note that some items cannot be set depending on the output type.
  Co-01 to Co-07: Valid when the current or continuous voltage output is used.
  tPo.01 to tPo.06: Valid when the relay or voltage pulse output is used.

■ Description of display

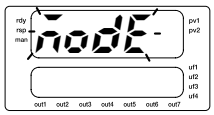


The output No. can be changed with the [<] key or [>] key.

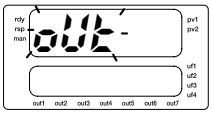


■ Setting procedures

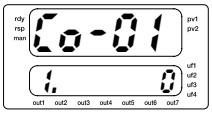
(1) Keep the [para] key pressed for 2 s in the operation display status.
>> nodE is flashing on the upper display.



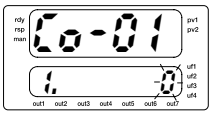
(2) Press the [∨] key or [para] key several times until oUt is shown on the upper display.
>> oUt is flashing on the upper display.



(3) Press the [enter] key.
>> Co-01 is shown on the upper display.
(To set input 2, change the value with the [>] key or [<] key.)



(4) Press the [enter] key.
>> The value on the lower display starts flashing.



(5) Set a desired value with the [∨] key or [∧] key.

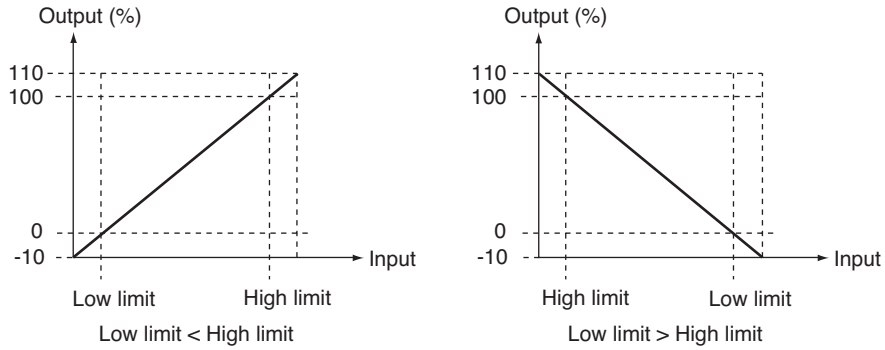
(6) Press the [enter] key to set the value.

(7) In the same manner, return with the [∨] key or [∧] key. Repeat the steps (3) to (6) to configure the settings for Co-02 to Co-07 and bPo.01 to bPo.06.

(8) When all settings have been completed, press the [display] key.
>> The operation is returned to the operation display status.

■ Continuous output setup

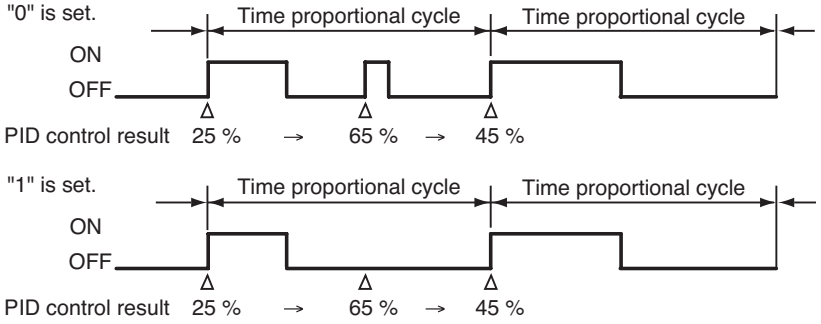
In the output range (Co-01), a scaling-calculated current of 0 to 100 % or a continuous voltage range is set.
In the output type (Co-02) and loop/channel definition (Co-03), data is set which becomes the input for scaling calculation.
In the output decimal point position (Co-04), the decimal point position is set for the low limit of the output scaling (Co-05) and the high limit of the output scaling (Co-06).
The output of the scaling calculation using the low limit of the output scaling (Co-05) and the high limit of the output scaling (Co-06) becomes as shown in the Figure below.



However, when the output range is 0 to 20 mA, 0 to 5 V, or 0 to 10 V, the output becomes 0 to 110 %.
In the linearization table group definition (Co-07), you can set so that the scaling calculation to the linearization approximation value is performed.
Additionally, by setting the linearization table group (Prior) of the priority bank (Pr-02), you can change to the internal contact input definition.

■ Time proportional output setup

When the output type (tPo.01) is set to 1 to 6, the time proportional value is output according to the settings of the time proportional cycle (tPo.05).
According to the time proportional operation type (tPo.03), the time proportional output becomes as follows.
When "0: Priority on controllability" is set, the output may be turned ON twice or more within the time proportional cycle. On the contrary, when "1: Priority on device life" is set, the output is turned ON zero time to once within the time proportional cycle.



The min. ON/OFF time (tPo.04) is valid. However, even though "0" is set, the min. ON/OFF time becomes 1 ms. In the relay output, even though a value less than "50" is set, the min. ON/OFF time on the operation is 50 ms.
The linearization table group definition (tPo.06), can be set so that the time proportional output corresponding to the linearization approximation value is made.
Additionally, by setting the linearization table use group (Prlor) for OUT of the priority bank (Pr-02), you can change to the internal contact input definition. The latch (tPo.02) becomes invalid.

■ ON/OFF output setup

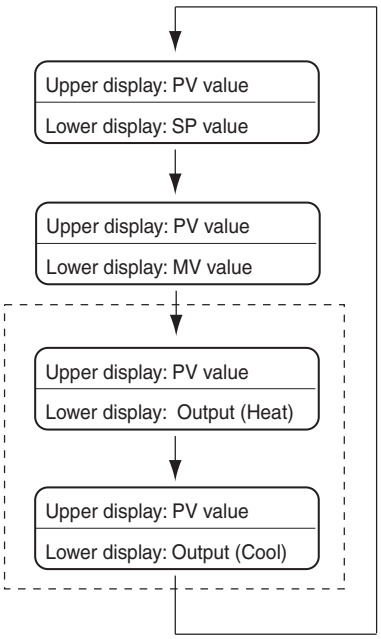
When the output type (tPo.01) is set at "0", the output becomes the OFF output.
When any of the standard bit Nos. 1024 to 2047 is set in the output type (tPo.01), the ON/OFF status of this standard bit is output.
The latch (tPo.02) and the min. ON/OFF time (tPo.04) are valid.
Additionally, even though a value less than "50" is set in the relay output, the min. ON/OFF time on the operation is 50 ms.
The time proportional operation type (tPo.03), time proportional cycle (tPo.05), and linearization table group definition (tPo.06) are invalid.

Chapter 5. OPERATION AND GENERAL FUNCTIONS

5 - 1 Operation Displays

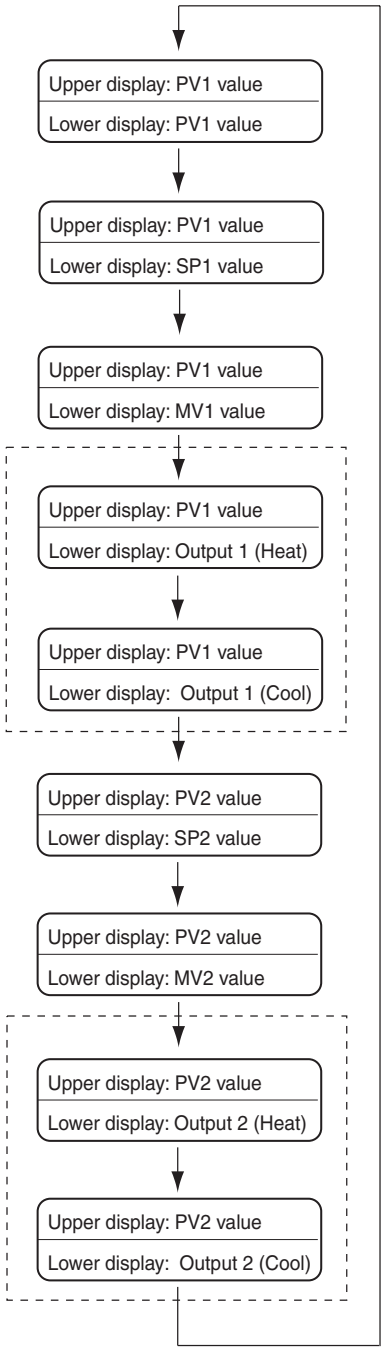
Every time the [display] key is pressed, the display is changed as follows.
The display change does not affect the control. Therefore, this unit can be operated with a desired display selected.

■ 1-loop

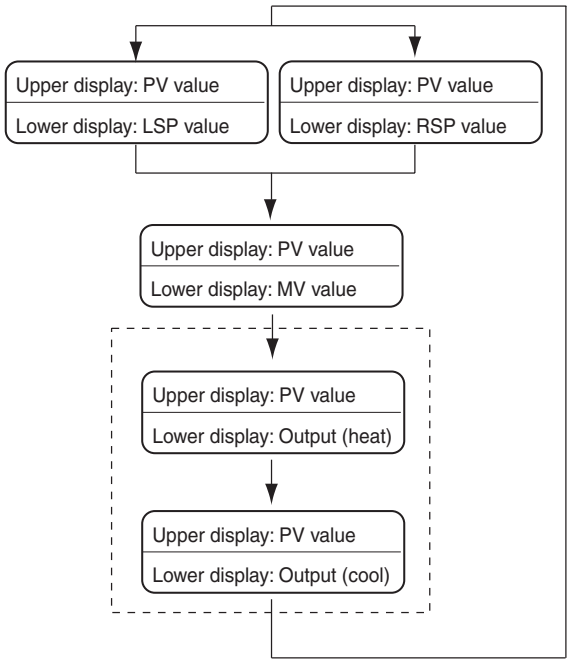


Displayed only when heat/cool control is selected.

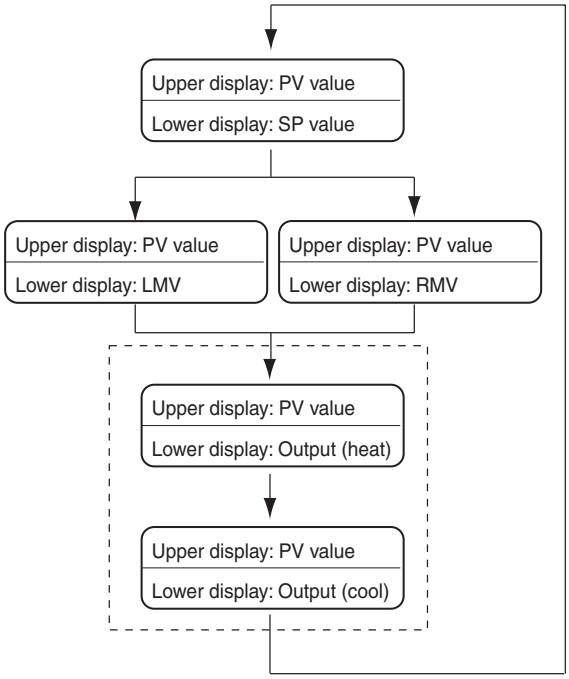
■ 2-loop independent



■ 1-loop with RSP



■ Computer backup

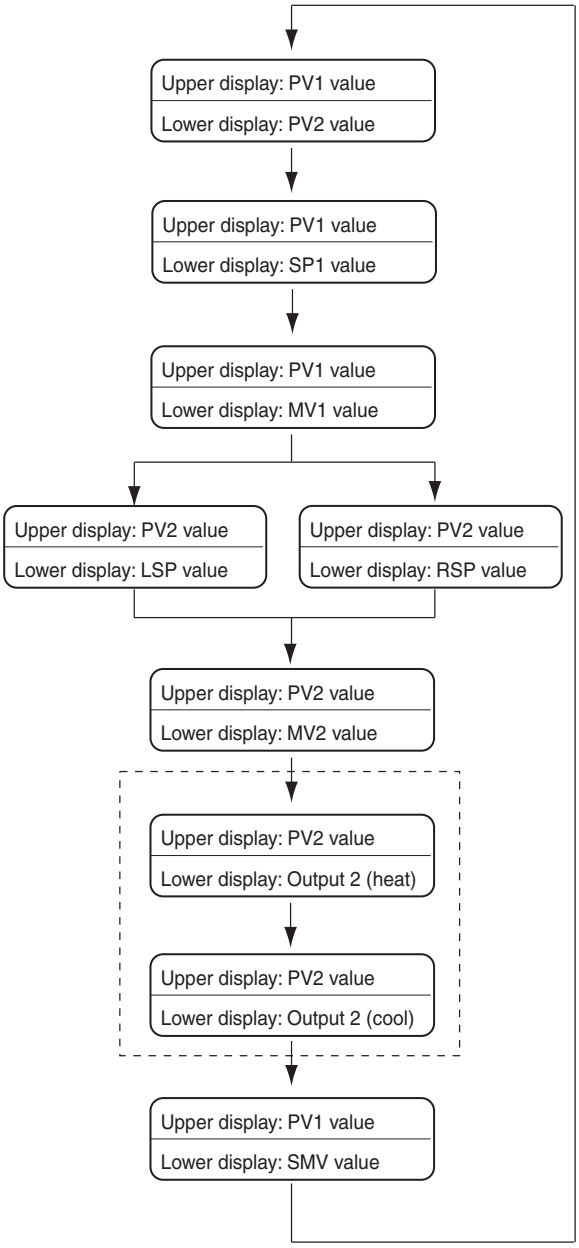


Displayed only when heat/cool control is selected.

LMV: Local MV (PID control output of this unit)

RMV: Remote MV (MV output from host station)

■ Internal cascade



Displayed only when the slave selects heat/cool control.

SMV: MV output on slave side

PV1: PV on master side

PV2: PV on slave side

■ Display status of mode indicator lamps

When two loops are operated independently, two PID controls are executed in the internal cascade control. Therefore, according to the displayed PV input No., each mode indication LED is lit, flashing, or off with the patterns shown in the tables below.

Meaning of display ❍ : Lit.
△ : Flashing
× : Off

• "rdy" LED

Mode	Display			
	PV1	PV2	PV1, PV2	Other
Loop 1: RUN Loop 2: RUN	×	×	×	×
Loop 1: READY Loop 2: RUN	❍	△	△	△
Loop 1: RUN Loop 2: READY	△	❍	△	△
Loop 1: READY Loop 2: READY	❍	❍	❍	❍

• "man" LED

Mode	Display			
	PV1	PV2	PV1, PV2	Other
Loop 1: AUTO Loop 2: AUTO	×	×	×	×
Loop 1: MANUAL Loop 2: AUTO	❍	△	△	△
Loop 1: AUTO Loop 2: MANUAL	△	❍	△	△
Loop 1: MANUAL Loop 2: MANUAL	❍	❍	❍	❍

• "rsp" LED

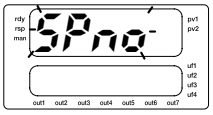
Mode	Display			
	PV1	PV2	PV1, PV2	Other
Loop 1: LSP Loop 2: LSP	×	×	×	×
Loop 1: LSP Loop 2: RSP	△	❍	△	△

5 - 2 How to Change the SP

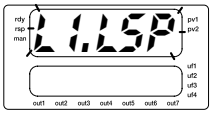
■ Setting procedures

The following describes an example that the LSP1 is changed when using the multi-SP:

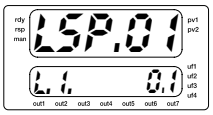
(1) Keep the [sp/ev] key pressed for 2s in the operation display status.
>> SPno is flashing on the upper display.



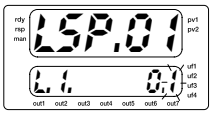
(2) Press the [∨] key or [sp/ev] key several times until L1.LSP is shown on the upper display.
>> L1.LSP is flashing on the upper display.



(3) Press the [enter] key.
>> LSP.01 is shown on the upper display. At this time, check that the auxiliary display shows L.1. This shows that the loop 1 is currently active.



(4) Press the [enter] key.
>> The value on the lower display starts flashing.



(5) Set a desired value with the [∨] key or [∧] key.

(6) Press the [enter] key to set the value.

(7) When the setting has been completed, press the [display] key.
>> The operation is then returned to the operation display status.

🕮 Note

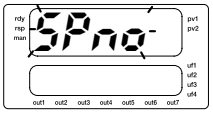
- When changing LSP1 of loop 2, select L2.LSP in step (2).
- When using the recipe, change the LSP1 from the loop 2 recipe bank (bank display: L2.rEC) of the SP/EV bank.

5 - 3 How to Change the SP Group/Recipe Group

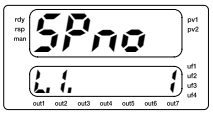
When multi-SP group and multiple recipe groups are set, the SP group and recipe group used for control can be changed.
The multi-SP/recipe is set using the setup bank.
For details, refer to:
☞ 6-5 How to Use the Multi-SP (on page 6-15)
6-6 How to Use Recipes (on page 6-17)

■ Setting procedures

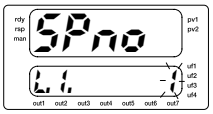
(1) Keep the [sp/ev] key pressed for 2s in the operation display status.
>> SPno is flashing on the upper display.



(2) Press the [enter] key.
>> Check that the auxiliary display shows L.1.. This shows that the loop 1 is currently active. If you want to change it to loop 2, change the value with the [∨] key, [∧] key, [>] key or [<] key.



(3) Press the [enter] key.
>> The value on the lower display starts flashing.



(4) Set a desired value with the [∨] key or [∧] key.
(5) Press the [enter] key to set the value.
(6) When the setting has been completed, press the [display] key.
>> The operation is then returned to the operation display status.

⚠ Handling Precautions

- When "SP group selection/recipe group selection" of the function priority (loop) is set with the internal given high priority, the group cannot be changed using the key operation.
  For details, refer to:
  ☞ 6-1 How to Set the Priority (on page 6-1).

5 - 4 How to Change the PID (auto tuning)

■ Starting procedures

(1) Check that the PV inputs and final control elements (heater power supply, etc.) are connected correctly and that the unit is ready for control.

(2) Press the [display] key to display the loop, in which the AT (auto tuning) is executed. (PV1 or PV2: For 2-input model)

(3) Check that the displayed loop is in the RUN and AUTO modes.

(4) Keep the [at] key pressed for 2s. (The function key registration is set in the initial settings.)

>> The display status of *AT.on* on the lower display changes from flashing to lit. The AT is then started.

■ Stopping procedures

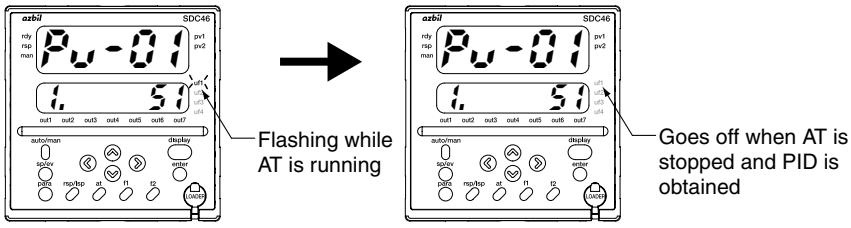
Normally, the AT completes automatically. To stop the AT while it is running, keep the [at] key again pressed for 2s.

>> The display status of *AT.oF* on the lower display is then changed from flashing to lit. The AT is then stopped.

Additionally, the AT is also stopped when the operation mode is changed to the READY mode or MANUAL mode.

■ Display while AT is running

The "uf1" LED is flashing while the AT of the loop 1 is running.
(The user function indicator lamp setting is set at the initial value.)
When the AT has been completed and the PID has been obtained, the "uf1" LED is turned off.
The new PID value is written into the PID group currently being used.
Since no display is given while the AT of the loop 2 is running, set the user function indicator lamp when necessary.



⚠ Handling Precautions

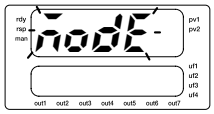
- Before starting the AT, check the PV inputs or final control elements are connected correctly. Make the control operation ready to start.
- To start the AT, it is preconditioned that the PV input error does not occur in the RUN mode and AUTO mode.
- For 2-input models, the AT cannot be started when both the PV1 and PV2 are displayed.
  With the [display] key, change the display to a loop you want to run the AT.
- If the READY mode or MANUAL mode is changed, or PV input error or power failure occurs while the AT is running, the AT is completed without changing of the PID constants.

5 - 5 How to Change the PID (manual)

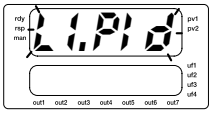
■ Setting procedures

The following describes an example that the PID is changed when using the multi-SP:

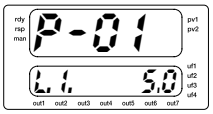
(1) Keep the [para] key pressed for 2s in the operation display status.
>> mode is flashing on the upper display.



(2) Press the [∨] key or [para] key several times until L1.PId is shown on the upper display.
>> L1.PId is flashing on the upper display.



(3) Press the [enter] key.
>> P-01 is shown on the upper display. This shows the proportional band of the 1st group. To change the PID group, change it with the [<] key or [>] key.



(4) Select an item you want to set with the [∨] key or [∧] key.
>> The selected item is shown on the upper display.

(5) Press the [enter] key.
>> The value on the lower display starts flashing.

(6) Set a desired value with the [∨] key or [∧] key.

(7) Press the [enter] key to set the value.

(8) When the setting has been completed, press the [display] key.
>> The operation is then returned to the operation display status.

Note

- To change the PID group of the loop 2, select L2.PId in step (2). When using the recipe, change the PID from the recipe bank (L2.rEC) of the loop 2 of the SP/EV bank.

5 - 6 How to Change the Event Action Point

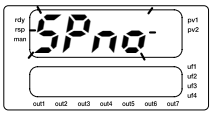
The event action point setting procedures may vary depending on the setting of the recipe enabled setup of the setup bank (item display: C-010), that is, multi-SP and recipe.

- If multi-SP use is set.
  The event action point is set using the event setup bank.
  The event action point setting consists of one set of main setting and sub setting for each event No.

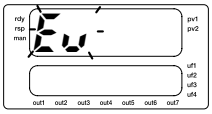
- If recipe use is set.
  The action points of events 1 to 8 are set using the loop 1 recipe bank while the action points of events 9 to 16 are set using the loop 2 recipe bank.
  The event action point setting consists of main settings and sub settings equivalent to the number of SP groups for each event No.

■ Setting procedures (for multi-SP)

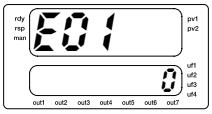
(1) Keep the [sp/ev] key pressed for 2s in the operation display status.
>> SPno is flashing on the upper display.



(2) Press the [∨] key or [sp/ev] key several times until Ev is shown on the upper display.
>> Ev is flashing on the upper display.



(3) Press the [enter] key.
>> The main setting of the action point 1 group is shown on the upper display.



(4) Select an item you want to set with the [∨] key or [∧] key.
>> The selected item is shown on the upper display.

(5) Press the [enter] key.
>> The value on the lower display starts flashing.

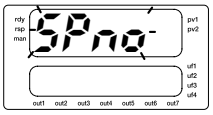
(6) Set a desired value with the [∨] key or [∧] key.

(7) Press the [enter] key to set the value.

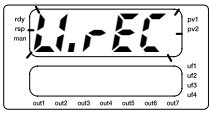
(8) When the setting has been completed, press the [display] key.
>> The operation is then returned to the operation display status.

■ Setting procedures (for recipe)

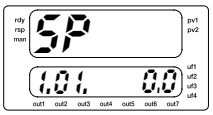
(1) Keep the [sp/ev] key pressed for 2s in the operation display status.
>> SPno is flashing on the upper display.



(2) Press the [∨] key or [sp/ev] key several times until L1.rEC is shown on the upper display. (L2.rEC for loop 2 recipe)
>> L1.rEC is flashing on the upper display.



(3) Press the [enter] key.
>> The SP of the recipe group 1 of the loop 1 is shown on the upper display.



(4) Select an item you want to set with the [∨] key.
>> The main setting of the event 1 group is shown.



(5) Every time the [∨] key is pressed, the display changes until the sub setting of the event 8 group is shown.
>> The selected item is shown on the upper display.

(6) Press the [enter] key.
>> The value on the lower display starts flashing.

(7) Set a desired value with the [∨] key or [∧] key.

(8) Press the [enter] key to set the value.

(9) When the setting has been completed, press the [display] key.
>> The operation is then returned to the operation display status.

! Handling Precautions

- If the operation type of the event is not set, "-----" is shown on the lower display and the setting cannot be configured.

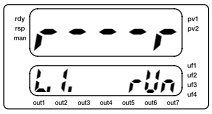
5 - 7 How to Start and Stop the Control Operation (RUN/READY)

■ Setting procedures

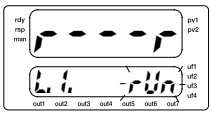
(1) Keep the [para] key pressed for 2s in the operation display status.
>> "mode" is flashing on the upper display.



(2) Press the [enter] key.
>> "r----r" is shown on the upper display. At this time, check that the auxiliary display shows "L.1". This shows that the loop 1 is currently active. If you want to change it to loop 2, change the value with the [∨] key, [∧] key, [>] key or [<] key.)



(3) Press the [enter] key.
>> The value on the lower display starts flashing.



(4) Set a desired mode with the [∨] key or [∧] key.
"run": RUN mode
"rdy": READY mode

(5) Press the [enter] key to set the value.

(6) Press the [display] key.
>> The operation is then returned to the operation display status.

5 - 8 How to Manually Output the MV (AUTO/MANUAL)

This function is intended to change the MV using the key operation regardless of the operation status of the instrument.

■ Setting procedures

(1) In the operation display status, press the [display] key to display a loop you want to put it in the manual mode. (This operation is valid only for 2-loop models.)

(2) In the operation display status, keep the [auto/man] key pressed for 2s.
>> The display status of "man" on the lower display changes from flashing to lit (operation mode changes to the manual operation mode) and the numeric value starts flashing. (The "man" LED is lit.)

(3) Change the output value to a desired level with the [∨] key, [∧] key, [<] key, or [>] key.
>> The MV changes in synchronization with the key operation. (It is not necessary to press the [enter] key.)

(4) To return to the auto mode, keep the [auto/man] key again pressed for 2s.
>> The display status of "Auto" on the lower display changes from flashing to lit and the operation mode changes to the auto mode. (The "man" LED is off.)

Handling Precautions

- For 2-input models, when PV1 and PV2 are displayed at the same time, the mode cannot be changed. With the [display] key, change the display to a loop you want to run.

Note

- Bumpless (MV before change continues) or preset value can be selected for the MV when changing the manual mode.
  For details about settings, refer to:
  ☞ "Output operation at changing Auto/Manual" ("Ctd.03") of the control bank.

5 - 9 How to Change to the Remote SP (RSP/LSP)

When the loop with the RSP or internal cascade is selected in the 2-input model, a set value to be used can be selected from the remote or local.

■ How to change to the remote SP (RSP)

(1) In the operation display status, keep the [rsp/lsp] key pressed for 2s.
(The function key registration is set at the initial setting.)
When using the internal cascade control, perform the operation with PV2 displayed.
>> The display status of rSP on the upper display changes from flashing to lit and the mode changes to the remote SP mode. (The "rsp" LED is lit.)

■ How to change to the local (LSP)

(1) In the operation display status, keep the [rsp/lsp] key pressed for 2s.
When using the internal cascade control, perform the operation with PV2 displayed.
>> The display status of LSP on the upper display changes from flashing to lit and the mode is changed to the local SP mode. (The "rsp" LED is turned off.)

Handling Precautions

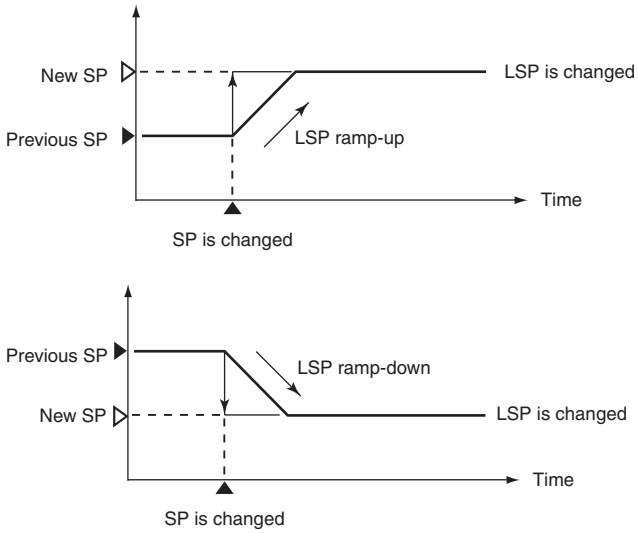
- For 2-input models, when PV1 and PV2 are displayed at the same time, the mode cannot be changed. With the [display] key, change the display to a loop you want to run.

Note

- When changing the remote SP to the local SP, the remote SP immediately before changing is written to the local SP, enabling the continuous control. (RSP tracking function)
For details about setting, refer to:
☞ RSP tracking (CSP.04) of SP configuration bank.

5 - 10 How to Change the SP with Constant Ramp

When changing the set value of the LSP or the SP group selection, it is possible to change the SP with a constant SP ramp.

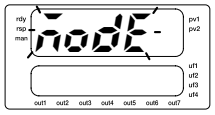


■ Bank and settings

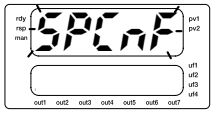
Bank	Item display	Item name	Settings
SPCnF	CSP.01	SP ramp unit	0: No decimal point/s, 1: No decimal point/min, 2: No decimal point/h, 3: 0.1/s, 4: 0.1/min, 5: 0.1/h, 6: 0.01/s, 7: 0.01/min, 8: 0.01/h, 9: 0.001/s, 10: 0.001/min, 11: 0.001/h
	CSP.02	SP ramp-up for LSP	0 U (No ramp) 1 to 32000 U (Decimal point position may vary depending on the SP ramp unit.)
	CSP.03	SP ramp-down for LSP	0 U (No ramp) 1 to 32000 U (Decimal point position may vary depending on the SP ramp unit.)

■ Setting procedures

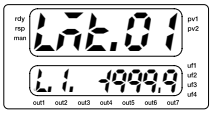
(1) Keep the [para] key pressed for 2s in the operation display status.
>> mode is flashing on the upper display.



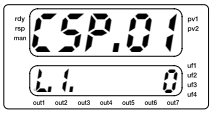
(2) Press the [∨] key or [para] key several times until SPCnF is shown on the upper display.
>> SPCnF is flashing on the upper display.



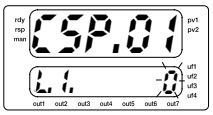
(3) Press the [enter] key.
>> LAt.01 is shown on the upper display. At this time, check that the auxiliary display shows L.1. This shows that the loop 1 is currently active.



(4) Press the [∨] key several times until CSP.01 is shown on the upper display.
>> CSP.01 is flashing on the upper display.



(5) Press the [enter] key.
>> CSP.01 is shown on the lower display.



(6) Set a desired value with the [∨] key or [∧] key.

(7) Press the [enter] key to set the value.

(8) In the same manner, return with the [∨] key or [∧] key. Repeat the steps (4) to (7) to configure the settings for CSP.02 to CSP.03.

(9) When settings have been completed, press the [display] key.
>> The operation is returned to the operation display status.

■ Conditions for ramp start

- LSP value is changed.
- SP group (multi-SP group/recipe group) is changed.
- Mode is changed from RSP to LSP.

■ Conditions for ramp start with PV used as start point

If any of the following arises, the ramp is started with PV used as start point instead of the previous SP:

- The power is turned ON.
- The MANUAL mode is changed to the AUTO mode.
- The READY mode is changed to the RUN mode.
- The through output is changed to the backup mode.
- The fixed value output is released.
- The "Loop type" item of the setup bank is changed.

⚠ Handling Precautions

- The ramp setting for the RSP is invalid.

Chapter 6. FUNCTIONS OFTEN USED FOR OPERATIONS OTHER THAN CONTROL

6 - 1 How to Set the Priority

In the functions, one of set value, internal contact input (digital input), and other conditions can be used as conditions for operation change. What condition is used is set by the priority.

■ Setting bank

Priority bank (*Prior*)

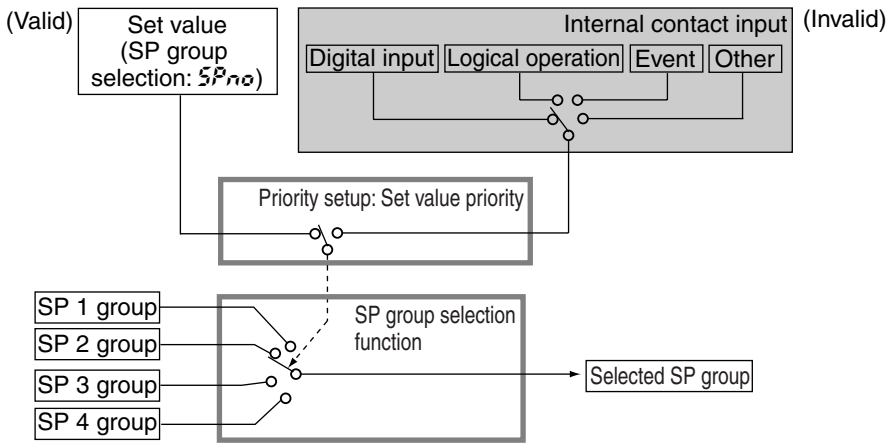
■ Example: Selection of SP group

The following describes an example that the SP group selection function is used for four SP groups.
Set value (SP group selection) or internal contact input (digital input) is used for conditions for SP group selection is determined by the priority.

● SP group of control loop 1 is selected by the set value (SP group selection).

Configure the settings as shown below in the priority bank (*Prior*) setup.

Display item	Auxiliary display	Item name	Setting
LPr.01	*1.*	(Loop 1) SP group selection	0: Set value priority

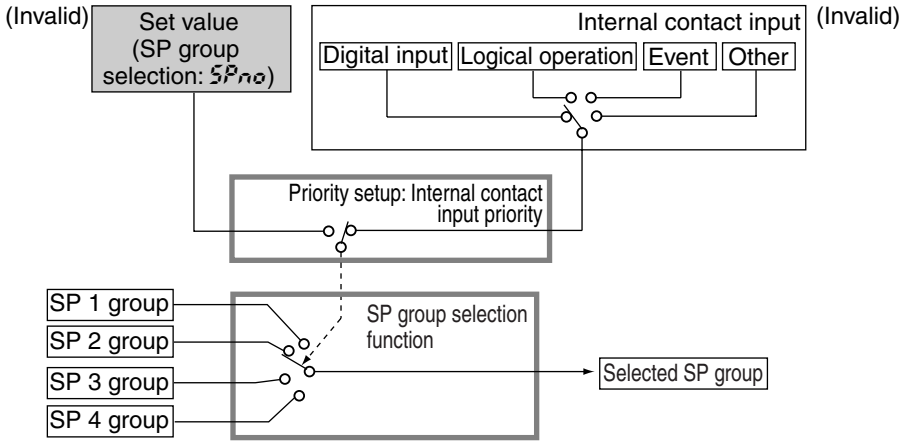


When the priority setup is set at "Set value priority," the SP group selection function operates according to the set value of the SP group selection.
The SP group selection with the digital input is set for the internal contact input as shown in the Figure above. However, since the priority setup is set at "Set value priority," the SP group selection does not operate even though the digital input is operated.

● **SP group of control loop 1 is selected by the internal contact input (digital input).**

Configure the settings as shown below in the priority bank (Prior) setup.

Display item	Auxiliary display	Item name	Setting
LPr.01	1.	SP group selection	1: Internal contact input priority



Since the priority setup is set at "Internal contact input priority," the SP group selection operates by the internal contact input.

When the SP group selection with the digital input is set for the internal contact input as shown in the Figure above, the SP group selection function operates by the digital input.

Since the priority setup is set at "Internal contact input priority," the SP group selection does not operate even though the set value of the SP group selection is changed.

If the SP group selection is not set for the internal contact input when the priority setup is set at "Internal contact input priority," this status is the same as that the input is OFF. One SP group is always selected.

■ Functions whose priority can be set for each control loop

- SP group selection
- PID group selection
- RUN/READY mode selection
- AUTO/MANUAL mode selection
- LSP/RSP mode selection
- Backup/through output selection

In functions other than the PID group selection, two kinds of settings, "0: Set value priority" and "1: Internal contact input priority", can be set.

In the PID group selection, three kinds of settings, "0: Set value priority", "1: Internal contact input priority," and "2: Zone PID function priority," can be set.

■ Functions whose priority can be set regardless of control loop

- Release all latches
- Linearization table group definition for output

Two kinds of settings, "0: Set value priority" and "1: Internal contact input priority," can be set.

6 - 2 How to Use Events

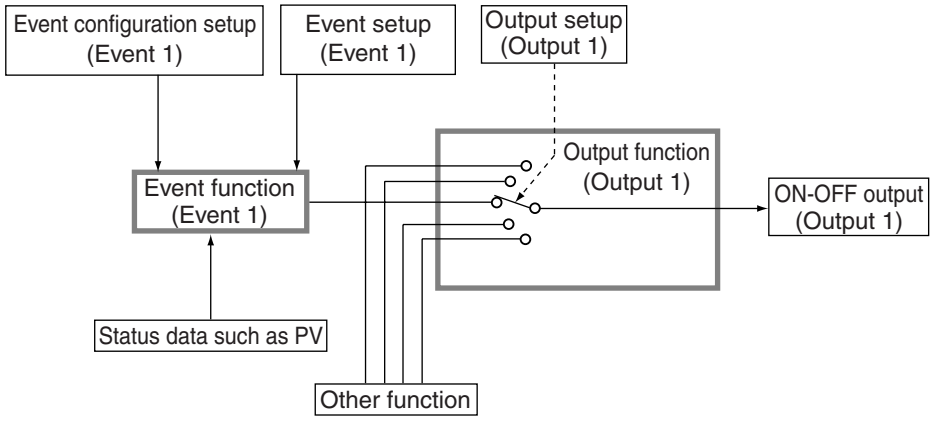
The ON/OFF status of the event is determined according to the conditions for each operation type.
The ON/OFF of the event can be output to the ON/OFF output terminal or digital output terminal.
Additionally, the ON/OFF status of the event can be used as input of the internal contact input function.

■ Setting banks

Event configuration bank (EvCnF)
Event setup bank (Ev)
Output bank (oUt)

■ Example: PV high limit alarm (on if an error occurs.)

The following describes an example that the relay of the output 1 is turned ON if the PV of loop 1 exceeds 800 °C. In this example, the event function and output function are used.



(1) Set the event configuration of event 1.
Configure the settings as shown below in the event configuration bank (EvCnF) setup.

Display item	Auxiliary display	Item name	Settings
EP-01	01	Operation type	1: PV high limit
EP-02	01	Loop/Channel definition	1
EP-03	01	Polarity	0: Direct
EP-04	01	Standby	0: No standby
EP-05	01	Operation at READY	0: Continue
EP-06	01	Decimal point position	0: No decimal point
EP-07	01	Hysteresis	5
EP-08	01	ON delay	0.0 (Unit: s)
EP-09	01	OFF delay	0.0 (Unit: s)

(2) Set the event action point of event 1.
Configure the settings as shown below in the event setup bank (Ev) setup.

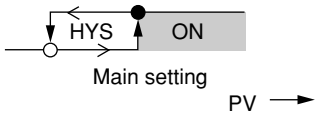
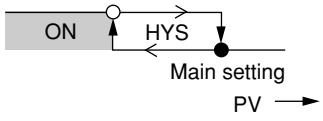
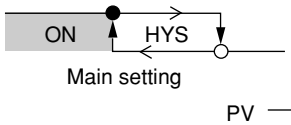
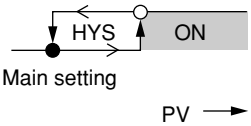
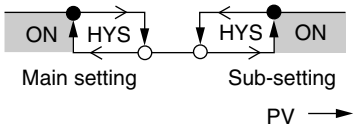
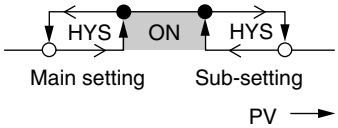
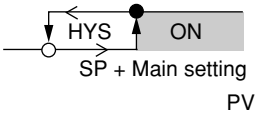
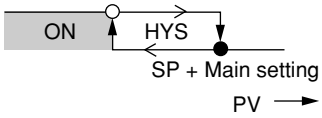
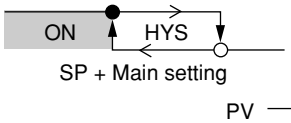
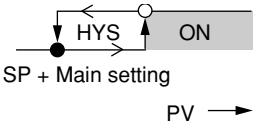
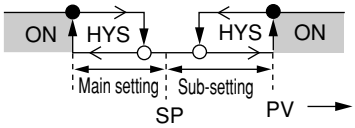
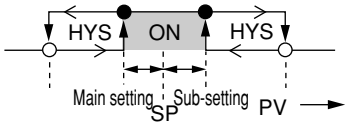
Display item	Auxiliary display	Item name	Settings
E01	No display	Event 1 main setting	800
E01.Sb	No display	Event 1 sub-setting	(setting is disabled.)

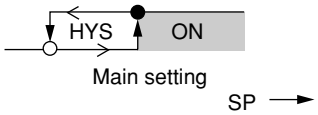
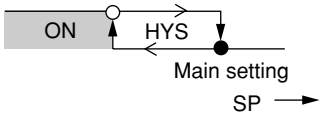
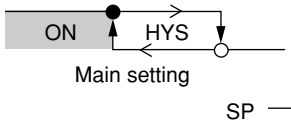
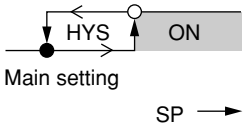
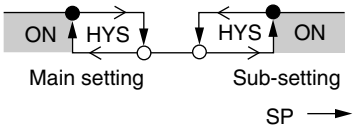
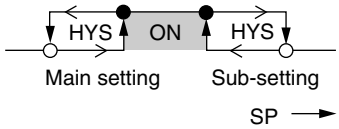
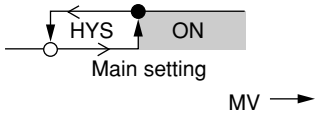
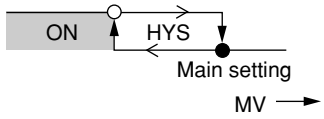
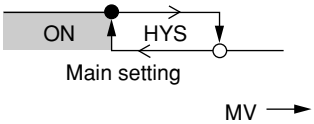
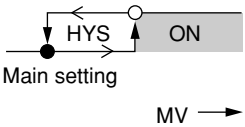
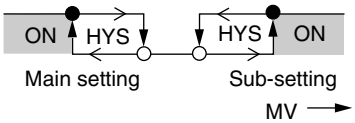
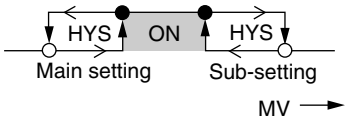
(3) Configure the settings so that the ON/OFF status of event 1 is output from output 1.
Configure the settings as shown below in the output bank (oUt) setup.

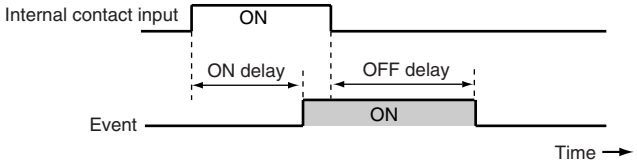
Display item	Auxiliary display	Item name	Settings
tPo.01	01.	Output type	1088: Event 1
tPo.02	01.	Latch	0: No latch
tPo.03	01.	Time proportional operation type	(setting is disabled.)
tPo.04	01.	Min. ON/OFF time	250 (ms)
tPo.05	01.	Time proportioning cycle time	(setting is disabled.)
tPo.06	01.	Linearization table group definition	(setting is disabled.)

■ Event operation type, polarity, hysteresis, main setting, and sub-setting

According to the operation type, polarity, main setting, sub-setting, hysteresis, and other settings, the operation of the event becomes as follows:

Operation type	Set value of operation type	Direct action ● shows that the ON/OFF is changed at this value. O shows that the ON/OFF is changed at a point that "1U" is added to this value.	Reverse action ● shows that the ON/OFF is changed at this value. O shows that the ON/OFF is changed at a point that "1U" is added to this value.
No event	0	Always OFF	Always OFF
PV high limit	1		
PV low limit	2		
PV high/low limit	3		
Deviation high limit	4		
Deviation low limit	5		
Deviation high/ low limit	6		
Deviation high limit (Final SP reference)	7	Same as the direct action of the deviation high limit when the SP ramp is not used. The difference is that the SP ramp does not use the current SP, but it uses the final SP.	Same as the reverse action of the deviation high limit when the SP ramp is not used. The difference is that the SP ramp does not use the current SP, but it uses the final SP.
Deviation low limit (Final SP reference)	8	Same as the direct action of the deviation low limit when the SP ramp is not used. The difference is that the SP ramp does not use the current SP, but it uses the final SP.	Same as the reverse action of the deviation low limit when the SP ramp is not used. The difference is that the SP ramp does not use the current SP, but it uses the final SP.
Deviation high/ low limit (Final SP reference)	9	Same as the direct action of the deviation high/low limit when the SP ramp is not used. The difference is that the SP ramp does not use the current SP, but it uses the final SP.	Same as the reverse action of the deviation high/low limit when the SP ramp is not used. The difference is that the SP ramp does not use the current SP, but it uses the final SP.

Operation type	Set value of operation type	Direct action ● shows that the ON/OFF is changed at this value. O shows that the ON/OFF is changed at a point that "1U" is added to this value.	Reverse action ● shows that the ON/OFF is changed at this value. O shows that the ON/OFF is changed at a point that "1U" is added to this value.
SP high limit	10		
SP low limit	11		
SP high/low limit	12		
MV high limit	13		
MV low limit	14		
MV high/low limit	15		
Alarm (status)	61	ON if alarm occurs (alarm code AL01 to 99). OFF in other cases.	OFF if alarm occurs (alarm code AL01 to 99). ON in other cases.
READY (status)	62	ON in the READY mode. OFF in the RUN mode.	OFF in the READY mode. ON in the RUN mode.
MANUAL (status)	63	ON in the MANUAL mode. OFF in the AUTO mode.	OFF in the MANUAL mode. ON in the AUTO mode.
RSP (status)	64	ON in the RSP mode. OFF in the LSP mode.	OFF in the RSP mode. ON in the LSP mode.
During AT (Status)	65	ON when AT is executed. OFF when AT is stopped.	OFF when AT is executed. ON when AT is stopped.
During SP ramp	66	ON during SP ramp. OFF when SP ramp is not performed or is completed.	OFF during SP ramp. ON when SP ramp is not performed or is completed.
Control action (status)	67	ON during direct action (cooling). OFF during reverse action (heating).	OFF during direct action (cooling). ON during reverse action (heating).
Through output (status)	68	ON in the through output mode of the computer backup. OFF in the backup mode.	OFF in the through output mode of the computer backup. ON in the backup mode.

<table>
<tr><th>Operation type</th><th>Set value of operation type</th><th>Direct action</th><th>Reverse action</th></tr>
<tr><td>Timer
(status)</td><td>70</td><td colspan="2">The direct and reverse action settings are disabled for the timer event.
To use the timer event, it is necessary to set the operation type of the internal contact input to "Timer Stop/Start".
Additionally, multiple timer events can be controlled from individual internal contact input by setting an event No. in the loop/channel definition of the internal contact input.
● Setting items
• ON delay time: A period of time necessary for the event change from OFF to ON after the internal contact input has been changed from OFF to ON.
• OFF delay time: A period of time necessary for the event change from ON to OFF after the internal contact input has been changed from ON to OFF.
● Operation specifications
• The event is turned ON when the internal contact input ON continues for ON delay time or longer.
• The event is turned OFF when the internal contact input OFF continues for OFF delay time.
• In other cases, the current status is continued.
 

● CAUTION
The default settings of the ON delay and OFF delay before shipment are 0.0s.
The default setting of the loop/channel definition of the internal contact input is "0". In this case, all timer events can be stopped or started through one internal contact input.
Additionally, when a value exceeding "1" is set for the loop/channel definition, one specified timer event can be stopped or started through one internal contact input.</td></tr>
</table>

■ Event standby and operation at READY

"Standby" is a function that does not turn ON the event even though the event currently used satisfies the ON conditions when this unit is turned ON or when the READY mode is changed to the RUN mode.
The event is turned ON when the ON conditions are satisfied again once the OFF conditions have been satisfied.
"Standby + Standby at SP change" means that the standby is set again when the SP is changed (SP value and SP group number) in addition to the standby functions.
However, when the same SP value is written or when the SP value is not changed even though the SP group number is changed, the unit does not enter the standby mode.

	READY		READY→ RUN change	
EVENT state at READY setup / Standby setup	0: Continued	1: Forced OFF	0: Continued	1: Forced OFF
0: None	Usual operation	OFF	Usual operation	Usual operation
1: Standby	OFF	OFF	OFF (standby state)	OFF (standby state)
2: Standby + Standby at SP change	OFF	OFF	OFF (standby state)	OFF (standby state)

■ Event decimal point

The decimal point position of the main setting and sub-setting of the event setup bank (action point) and the hysteresis setting of the event configuration bank can be changed.

■ ON delay and OFF delay

ON delay is a function that delays the timing, at which the event status is changed from OFF to ON. OFF delay is a function that delays the timing, at which the event status is changed from ON to OFF. However, the operation with the operation type set at timer event is performed as described on the previous page.

6 - 3 How to Use Internal Contact Input

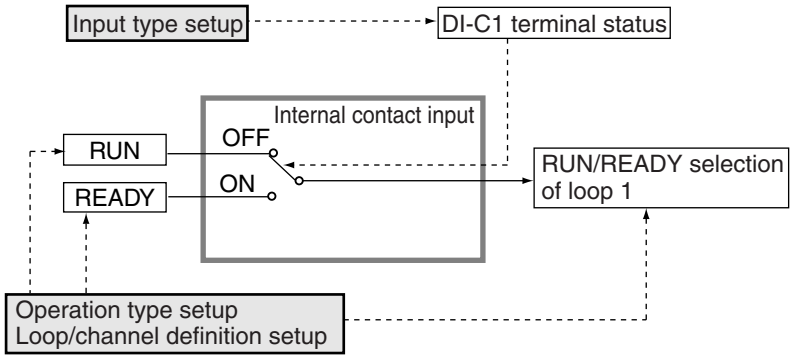
The internal contact input (digital input) can take in the ON/OFF data, which is specified in the input type, as internal contact input inside the instrument.
The change-over operation specified in the operation type can be performed with the ON/OFF data in the specified input type.

■ Setting banks

Priority bank (Prior)
Internal contact input bank (iC)

■ Example 1: RUN/READY change-over by internal contact input

The following describes an example that the RUN/READY of the loop 1 is changed to READY when the DI-C1 terminal status is ON and it is changed to RUN when the DI-C1 terminal status is OFF.



(1) Set the priority to the internal contact input priority.
Configure the settings as shown below in the priority bank (Prior) setup.

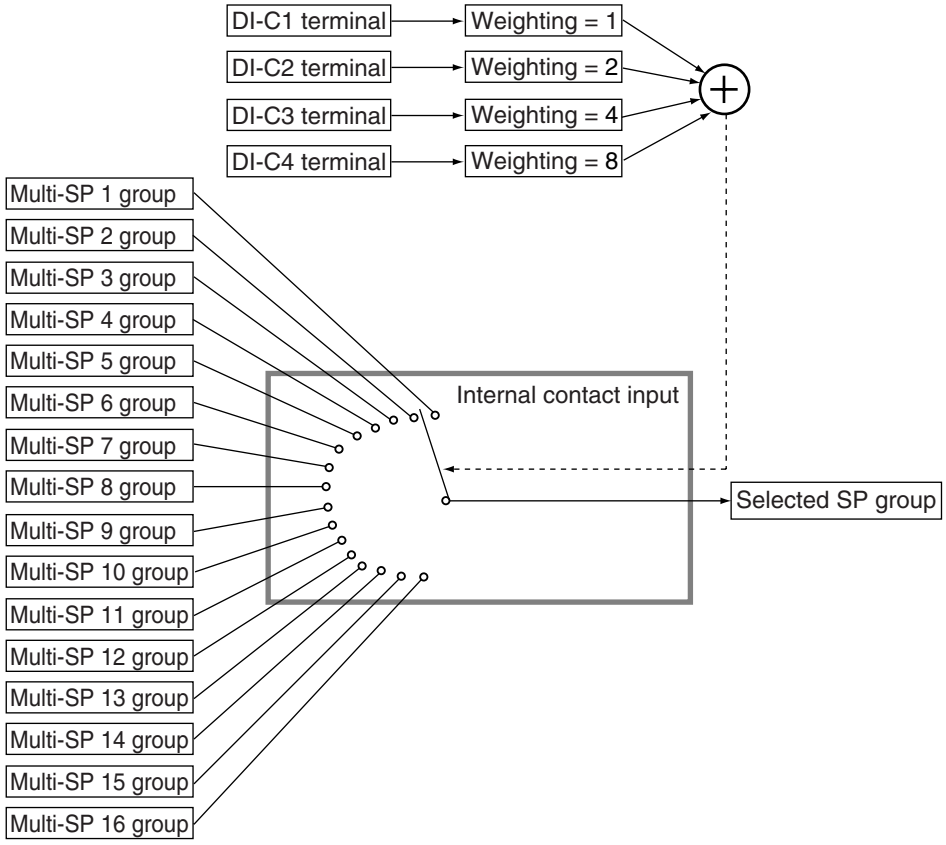
Display item	Auxiliary display	Item name	Setting
LPr.03	1.	RUN/READY mode selection	1: Internal contact input priority

(2) Set RUN/READY to the internal contact 1.
Configure the settings as shown below in the internal contact input bank (iC) setup.

Display item	Auxiliary display	Item name	Settings
iC-01	01.	Operation type	21: RUN/READY
iC-02	01.	Input type	1152: DI-C1 terminal status
iC-03	01.	Loop/channel definition	1: Loop 1
iC-04	01.	Weighting	(setting is invalid.)

■ Example 2: SP group selection by internal contact input

The following describes an example that the selection of multi-SP1 group to multi-SP 16 group in the loop 1 is made enabled using the DI-C1 to DI-C4 terminals.



DI-C1	OFF	ON	OFF	ON	• • • •	OFF	ON	OFF	ON
DI-C2	OFF	OFF	ON	ON	• • • •	OFF	OFF	ON	ON
DI-C3	OFF	OFF	OFF	OFF	• • • •	ON	ON	ON	ON
DI-C2	OFF	OFF	OFF	OFF	• • • •	ON	ON	ON	ON
Selected SP group	SP1	SP2	SP3	SP4	• • • •	SP13	SP14	SP15	SP16

(1) Set the priority to the internal contact input priority.

Configure the settings as shown below in the priority bank (*Prior*) setup.

Display item	Auxiliary display	Item name	Settings
LPr.01	No display	SP group selection	1: Internal contact input priority

(2) Set the SP system group.

Configure the settings as shown below in the setup bank (*SEtUP*) setup.

Display item	Auxiliary display	Item name	Settings
C-011	*1.*	SP system group	16

(3) Set the SP group selection for four groups of internal contact inputs.
In the internal contact input bank (IC), set four groups of internal contact inputs as described below.

Display item	Auxiliary display	Item name	Settings
IC-01	01.	Operation type	1: SP group selection
IC-02	01.	Input type	1152: DI-C1 terminal status
IC-03	01.	Loop/channel definition	1
IC-04	01.	Weighting	1
IC-01	02.	Operation type	1: SP group selection
IC-02	02.	Input type	1153: DI-C2 terminal status
IC-03	02.	Loop/channel definition	1
IC-04	02.	Weighting	2
IC-01	03.	Operation type	1: SP group selection
IC-02	03.	Input type	1154: DI-C3 terminal status
IC-03	03.	Loop/channel definition	1
IC-04	03.	Weighting	4
IC-01	04.	Operation type	1: SP group selection
IC-02	04.	Input type	1155: DI-C4 terminal status
IC-03	04.	Loop/channel definition	1
IC-04	04.	Weighting	8

■ Operation type (IC-01)

Select operations, which are to be changed over by internal contact input, from the following table, "Operation Type Settings" and then set them properly.

Set value and meaning of operation type	Set value and meaning of loop/channel definition
0: No function	0 to 127: Invalid
1: SP group selection	0: All loops, 1: Loop 1, 2: Loop 2, 3 to 127: Invalid
2: PID group selection	0: All loops, 1: Loop 1, 2: Loop 2, 3 to 127: Invalid
3: Fixed value output selection	0: All loops, 1: Loop 1, 2: Loop 2, 3 to 127: Invalid
4: Multi-ratio selection	0: All loops, 1: Loop 1, 2: Loop 2, 3 to 127: Invalid
5: Linearization use group selection (For output)	0: Invalid, 1 to 7: Output No., 8 to 127: Invalid
21: RUN/READY mode selection	0: All loops, 1: Loop 1, 2: Loop 2, 3 to 127: Invalid
22: AUTO/MANUAL mode selection	0: All loops, 1: Loop 1, 2: Loop 2, 3 to 127: Invalid
23: LSP/RSP mode selection	0: All loops, 1: Loop 1, 2: Loop 2 (slave side of internal cascade function), 3 to 127: Invalid
24: AT start/stop selection	0: All loops, 1: Loop 1, 2: Loop 2, 3 to 127: Invalid
25: Backup/through output selection	0: All loops, 1: Invalid, 2: Loop 2, 3 to 127: Invalid
41: Control operation polarity selection	0: All loops, 1: Loop 1, 2: Loop 2, 3 to 127: Invalid
42: SP RAMP enabled/disabled	0: All loops, 1: Loop 1, 2: Loop 2, 3 to 127: Invalid
46: Timer stop/start selection	0: All timer events, 1 to 16: Event No. of timer event, 17 to 127: Invalid
47: Release all latches	0 to 127: Invalid

■ Input type (ic-02)

Use to specify the ON/OFF data that the data internal contact input uses as input. This ON/OFF data shows various kinds of instrument statuses and it is called "standard bit".

For details about standard bit numeric values, refer to:

☞ Standard bit codes. (on p. App.-14)

■ Loop/channel definition (ic-03)

Use to specify a loop or channel is specified that becomes a target operated by the internal contact input. The meaning of the loop/channel definition may vary depending on the operation type.

For details, refer to:

☞ Operation Type Sttings on the previous page.

■ Weighting (ic-04)

Use to select a group or number in a specific operation type, such as SP group selection, PID group selection, fixed value output selection, multi-ratio selection, or selection of Linearization table use group (for OUT).

When the input is OFF, the value becomes "0". When the input is ON, the value becomes the set value.

When the operation type and loop/channel definition use the same internal contact input, a selection is determined by the sum of weighting values as shown in the table below.

Sum of weights / Operation type	0	1 or more
SP group selection	1 group	Group with "1" added to the sum of weighting values is selected.
PID group selection	1 group	Group with "1" added to the sum of weighting values is selected.
Fixed value output selection	Fixed value output is not used. (This value becomes the MV of the PID control.)	Fixed value output with a number equivalent to the sum of weighting values.
Multi-ratio selection	Multi-ratio is not used. (Ratio = 1.000)	Multi-ratio with a number equivalent to the sum of weighting values.
Linearization use group selection	Approximation by linearization table is not used.	Linearization group with the sum of weighting values

6 - 4 How to Use Digital Output

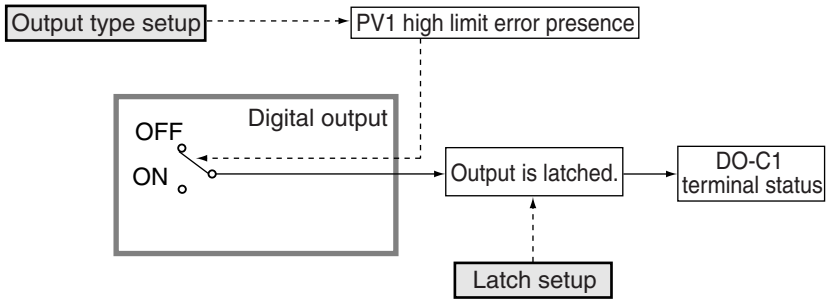
The digital output (DO) can output the ON/OFF data specified by the output type.
Additionally, the ON or OFF status of the digital output can be latched.

■ Setting banks

PV bank (Pu)
Digital output bank (do)

■ Example: DO turns ON if PV1 high limit error occurs

The following describes an example that the high limit error is given if the PV1 exceeds 1000.0(C or more, the PV1 high limit error alarm is output from the terminal DO-C1, and this ON status is latched.



(1) Set the high limit error of the PV1 input.
Configure the settings as shown below in the PV bank (Pu) setup.
Set the high limit of the PV1 using Pu-05.

Display item	Auxiliary display	Item name	Settings
Pu-01	1.	Range type	1: K thermocouple
Pu-02	1.	Decimal point position	1: One digit affer the decimal point
Pu-03	1.	Temperature unit	0: Centigrade (°C)
Pu-04	1.	Range low limit	0.0
Pu-05	1.	Range high limit	1000.0
Pu-06	1.	Cold junction compensation	0: Compensated inside instrument.
Pu-09	1.	Linear scaling low limit	(setting is disabled.)
Pu-10	1.	Linear scaling high limit	(setting is disabled.)
Pu-11	1.	PV square root extraction dropout	(setting is disabled.)
Pu-12	1.	Filter	0.00
Pu-13	1.	Bias	0.0
Pu-14	1.	Ratio	1.000
Pu-16	1.	Thermocouple/mV-input burnout	0: Upscale at burnout
Pu-20	1.	Linearization table group definition	0: Not used.

(2) Set the operation of the DO-C1 terminal.
Configure the settings as shown below using the C-column terminal in the digital output bank (do).

Display item	Auxiliary display	Item name	Settings
do.C.01	1.	Output type	1824: PV input high limit error (PV1)
do.C.02	1.	Latch	1: Latched at ON.

■ Output type (do.C.01)

Use to specify the ON/OFF data to be output from the digital output. This ON/OFF data shows various kinds of instrument statuses and it is called "standard bit".
The standard bit Nos. are set as output type.

🕮 Note

- For details about standard bit Nos., refer to:
  ☞ Standard bit codes. (on p. App.-14)

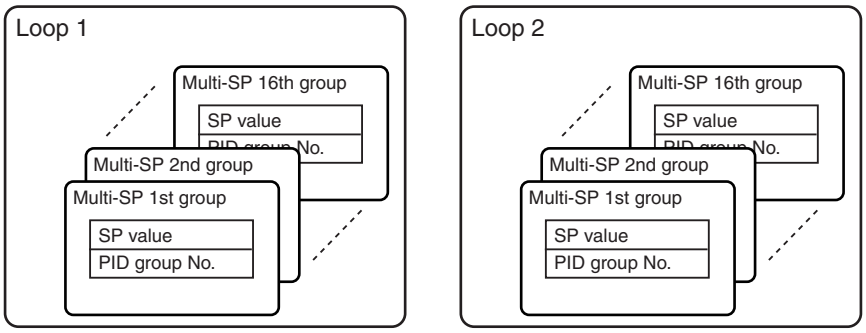
■ Latch (do.C.02)

Use to specify the latch operation of the digital output from the following selections:
0: Not latched.
1: Latched at ON.
2: Latched at OFF. (Except for OFF when the power is turned ON.)

To release the latch, the following methods are provided.
- Set the setup item "Release all latches" in the setup bank (C-003) to "1" (release latch).
- Change the latch setting (do.C.02) in the digital output bank to "0" (not latched).
- Turn OFF the power to this unit, and then turn it ON again.

6 - 5 How to Use the Multi-SP

The multi-SP can be set by combining LSP value and PID group definition on an SP group basis.
Up to 16 SP groups per loop are provided. You can select one group from these groups and use it for control.



■ Setting banks

Setup bank (SEtUP)
Loop 1 multi-SP bank (L1.LSP)
Loop 2 multi-SP bank (L2.LSP)
Loop 1 PID bank (L1.Pid)
Loop 2 PID bank (L2.Pid)
Priority bank (Prior)
SP group selection bank (SPno)

■ Features

PID constant group separated from the SP group is provided. When selecting an SP group, the constants of the PID group corresponding to the PID group definition set in the SP group are used for the control. When using PID constants common to multiple SP groups, you can configure the settings so that the same PID group can be specified.
Additionally, even though the selection of the SP group is changed, the action point set value of the event does not change.

■ Example: Multi-SP is used with two LSP groups.

The following describes an example that two LSP groups and PID constants of two groups are used with two SP groups in the loop 1:

(1) Set the SP to two groups using the multi-SP.
Configure the settings as shown below in the setup bank (SEtUP) setup.

Display item	Auxiliary display	Item name	Settings
C-010	No display	Recipe enabled	0: Multi-SP
C-011	No display	SP system group	2

(2) Set data for the SP group.
Configure the settings as shown below in the loop 1 multi-SP bank (L1.LSP) setup.

Display item	Auxiliary display	Item name	Settings
LSP.01	L.1.	(SP 1 group) LSP	100.0
Pid.01	L.1.	(SP 1 group) PID group definition (For LSP)	1
LSP.02	L.1.	(SP 2 group) LSP	200.0
Pid.02	L.1.	(SP 2 group) PID group definition (For LSP)	2

(3) Set data for the PID group.

Configure the settings as shown below in the loop 1 PID bank (L1.PId) setup.

Display item	Auxiliary display	Item name	Settings
P-01	L.1.	(Loop 1 PID 1 group) Proportional band	5.0
I-01	L.1.	(Loop 1 PID 1 group) Integration time	120
d-01	L.1.	(Loop 1 PID 1 group) Derivative time	30
oL-01	L.1.	(Loop 1 PID 1 group) MV low limit	0.0
oH-01	L.1.	(Loop 1 PID 1 group) MV high limit	100.0
(Omission)			
P-02	L.1.	(Loop 1 PID 2 group) Proportional band	5.0
I-02	L.1.	(Loop 1 PID 2 group) Integration time	100
d-02	L.1.	(Loop 1 PID 2 group) Derivative time	25
oL-02	L.1.	(Loop 1 PID 2 group) MV low limit	0.0
oH-02	L.1.	(Loop 1 PID 2 group) MV high limit	100.0
(Others omitted.)			

(4) Set the priority of the SP group selection.

Configure the settings as shown below in the priority bank (Prior) setup.

Display item	Auxiliary display	Item name	Settings
LPr.01	L.1.	(Loop 1) SP group selection	0: Set value priority

(5) Select an SP group.

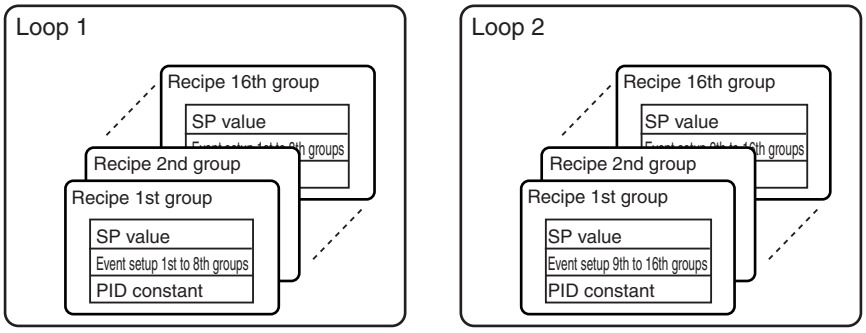
Select an SP group in the SP group selection bank (SPno).

To select the SP 2 group, configure the setting as described in the table below.

Display item	Auxiliary display	Item name	Settings
SPno	L.1.	(Loop 1) SP group selection	2: Select the SP 2 group.

6 - 6 How to Use Recipes

The recipe can be set by combining LSP value and event action point set value on an SP group basis. Up to 16 SP groups per loop are provided. You can select one group from these groups and use it for control.



■ Setting banks

Setup bank (SEtUP)
Event configuration bank (EvCnF)
Loop 1 recipe bank (L1.rEC)
Loop 2 recipe bank (L2.rEC)
Priority bank (PrLor)
SP group selection bank (SPno)

■ Features

When selecting an SP group, the operation is performed using the event action point set values and PID constants set in this SP group. Even though the event action point set values or PID constants of a certain SP group are changed, this does not affect other SP groups.
In the SP group of the loop 1, there are action point set values of event 1 to event 8.
In the SP group of the loop 2, there are action point set values of event 9 to event 16.

■ Example: Recipe of the LSP 2 group is used.

The following describes an example that two LSP groups, the event action point set values of two groups, and PID constants of two groups are used with two SP groups in the loop 1.
Event 1 is set to the PV high/low limit event of the loop 1, and event 2 to event 8 are set to "no event."

(1) Set the SP to two groups using the recipe.
Configure the settings as shown below in the setup bank (SEtUP) setup.

Display item	Auxiliary display	Item name	Settings
C-010	No display	Recipe enabled	1: Recipe
C-011	No display	SP system group	2

(2) Set the event 1 to the PV high/low limit event.

Configure the settings as shown below in the event configuration bank (EvCnF) setup.

Display item	Auxiliary display	Item name	Settings
EP-01	01.	(Event 1) Operation type	3: PV high/low limit
EP-02	01.	(Event 1) Loop/Channel definition	1
EP-03	01.	(Event 1) Polarity	0: Direct
EP-04	01.	(Event 1) Standby	0: No standby
EP-05	01.	(Event 1) Operation at READY	0: Continue
EP-06	01.	(Event 1) Decimal point position	1: One digit below the decimal point
EP-07	01.	(Event 1) Hysteresis	5.0
EP-08	01.	(Event 1) ON delay	0.0
EP-09	01.	(Event 1) OFF delay	0.0
EP-01	02.	(Event 2) Operation type	0: No event
(Omission)			
EP-01	03.	(Event 3) Operation type	0: No event
(Omission)			
EP-01	04.	(Event 4) Operation type	0: No event
(Omission)			
EP-01	05.	(Event 5) Operation type	0: No event
(Omission)			
EP-01	06.	(Event 6) Operation type	0: No event
(Omission)			
EP-01	07.	(Event 7) Operation type	0: No event
(Omission)			
EP-01	08.	(Event 8) Operation type	0: No event
(Followings are omitted.)			

(3) Set data for the SP group.

Configure the settings as shown below in the loop 1 recipe bank (L1.rEC) setup.

Display item	Auxiliary display	Item name	Settings
SP	1.01.	(Loop 1 SP 1 group) LSP	100.0
E01	1.01.	(Loop 1 SP 1 group) Event 1 main setting	120.0
E01.Sb	1.01.	(Loop 1 SP 1 group) Event 1 sub-setting	80.0
E02	1.01.	(Loop 1 SP 1 group) Event 2 main setting	(setting is disabled.)
E02.Sb	1.01.	(Loop 1 SP 1 group) Event 2 sub-setting	(setting is disabled.)
E03	1.01.	(Loop 1 SP 1 group) Event 3 main setting	(setting is disabled.)
E03.Sb	1.01.	(Loop 1 SP 1 group) Event 3 sub-setting	(setting is disabled.)
E04	1.01.	(Loop 1 SP 1 group) Event 4 main setting	(setting is disabled.)
E04.Sb	1.01.	(Loop 1 SP 1 group) Event 4 sub-setting	(setting is disabled.)
E05	1.01.	(Loop 1 SP 1 group) Event 5 main setting	(setting is disabled.)
E05.Sb	1.01.	(Loop 1 SP 1 group) Event 5 sub-setting	(setting is disabled.)
E06	1.01.	(Loop 1 SP 1 group) Event 6 main setting	(setting is disabled.)
E06.Sb	1.01.	(Loop 1 SP 1 group) Event 6 sub-setting	(setting is disabled.)

Display item	Auxiliary display	Item name	Settings
E07	1.01.	(Loop 1 SP 1 group) Event 7 main setting	(setting is disabled.)
E07.Sb	1.01.	(Loop 1 SP 1 group) Event 7 sub-setting	(setting is disabled.)
E08	1.01.	(Loop 1 SP 1 group) Event 8 main setting	(setting is disabled.)
E08.Sb	1.01.	(Loop 1 SP 1 group) Event 8 sub-setting	(setting is disabled.)
P	1.01.	(Loop 1 SP 1 group) Proportional band	5.0
I	1.01.	(Loop 1 SP 1 group) Integration time	120
d	1.01.	(Loop 1 SP 1 group) Derivative time	30
oL	1.01.	(Loop 1 SP 1 group) MV low limit	0.0
oH	1.01.	(Loop 1 SP 1 group) MV high limit	100.0
rE	1.01.	(Loop 1 SP 1 group) Manual reset	50.0
P-C	1.01.	(Loop 1 SP 1 group) Proportional band (cool)	5.0
I-C	1.01.	(Loop 1 SP 1 group) Integration time (cool)	120
d-C	1.01.	(Loop 1 SP 1 group) Derivative time (cool)	30
oL.C	1.01.	(Loop 1 SP 1 group) MV low limit (cool)	0.0
oH.C	1.01.	(Loop 1 SP 1 group) MV high limit (cool)	100.0
oI	1.01.	(Loop 1 SP 1 group) Initial output of PID control	0.0
SP	1.02.	(Loop 1 SP 2 group) LSP	200.0
E01	1.02.	(Loop 1 SP 2 group) Event 1 main setting	220.0
E01.Sb	1.02.	(Loop 1 SP 2 group) Event 1 sub-setting	180.0
(Omission)			
P	1.02.	(Loop 1 SP 2 group) Proportional band	5.0
I	1.02.	(Loop 1 SP 2 group) Integration time	120
d	1.02.	(Loop 1 SP 2 group) Derivative time	30
oL	1.02.	(Loop 1 SP 2 group) MV low limit	0.0
oH	1.02.	(Loop 1 SP 2 group) MV high limit	100.0
rE	1.02.	(Loop 1 SP 2 group) Manual reset	50.0
P-C	1.02.	(Loop 1 SP 2 group) Proportional band (cool)	5.0
I-C	1.02.	(Loop 1 SP 2 group) Integration time (cool)	100
d-C	1.02.	(Loop 1 SP 2 group) Derivative time (cool)	25
oL.C	1.02.	(Loop 1 SP 2 group) MV low limit (cool)	0.0
oH.C	1.02.	(Loop 1 SP 2 group) MV high limit (cool)	100.0
oI	1.02.	(Loop 1 SP 2 group) Initial output of PID control	0.0

The PID constants (cool) are valid only when the heat/cool control action is used. However, the display or setting can be configured regardless of valid/invalid setting.

The initial output of the PID control is used when the mode is changed from READY to RUN or it is used for the PID control when the power is turned ON. When the multi-SP is used (recipe is not used), the initial output of the PID control (Cnt.09) in the control bank is used.

(4) Set the priority of the SP group selection.

Configure the settings as shown below in the priority bank (Prior) setup.

Display item	Auxiliary display	Item name	Setting
LPr.01	L. 1.	(Loop 1) SP group selection	0: Set value priority

(5) Select an SP group.

Select an SP group in the SP group selection bank (SPno).

To select the SP 2 group, configure the setting as described in the table below.

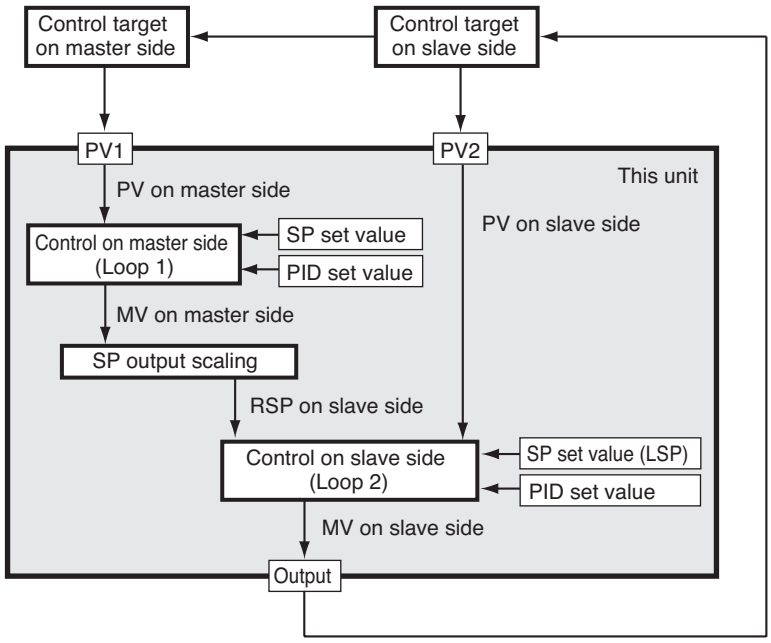
Display item	Auxiliary display	Item name	Setting
SPno	L. 1.	(Loop 1) SP group selection	2: Select the SP 2 group

When the SP group selection is changed, the SP value, event action point set value, and PID constant used for the control changes according to the SP group setup.

Chapter 7. FUNCTIONS USED AS REQUIRED

7 - 1 Internal Cascade Function

When this unit is a 2-input model, both the master and slave sides of the cascade control can be controlled only with one this unit.
The control on the master side operates as loop 1 control. The PV1 becomes PV on the master side.
The control on the slave side operates as loop 2 control. The PV2 becomes PV on the slave side.
The MV on the master side is converted into the RSP on the slave side through the SP output scaling.



! Handling Precautions

- The internal cascade function can be used only when this unit is a 2-input model. The 1-input model cannot use this function.

■ Setting banks

Setup bank (SETUP)
MV bank (mv)
Output bank (out)

■ Example: The MV on the slave side is output from output 3 by internal cascade control.

The following describes an example that the MV on the master side is converted into RSP ranging from 0 °C to 200 °C in order to control the slave side, and the MV on the slave side is output from output 3:

(1) Configure the settings so that the internal cascade function can be used.
Configure the settings as shown below in the setup bank (SETUP) setup.

Display item	Auxiliary display	Item name	Setting
C-001	No display	Loop type	4: Internal cascade

(2) Configure the settings so that the MV on the master side is converted into the RSP on the slave side.
Configure the settings as shown below in the MV bank (mv) setup.

Display item	Auxiliary display	Item name	Settings
CAS.01	L.1.	(Loop 1) Scaling method	0: Fixed
CAS.02	L.1.	(Loop 1) Scaling low limit	0.0
CAS.03	L.1.	(Loop 1) Scaling high limit	200.0
CAS.04	L.1.	(Loop 1) Tracking mode	(Setting is invalid.)
CAS.05	L.1.	(Loop 1) SP output filter	0.00 (unit: s)

The RSP conversion calculation formula may vary depending on the scaling method (CAS.01).

- Fixed (CAS.01 = 0)
  RSP = (MVm ÷ 100) × (SH - SL) + SL
- SP reference (CAS.01 = 1)
  RSP = (MVm ÷ 100) × (SH - SL) + SL + SPm
- PV reference (CAS.01 = 2)
  RSP = (MVm ÷ 100) × (SH - SL) + SL + PVm

The following shows the meanings of variables used in the calculation formulas:
SL: Scaling low limit
SH: Scaling high limit
MVm: MV on master side
SPm: SP on master side
PVm: PV on master side

(3) The MV on the slave side is output from the output 3.
The setup items may vary depending on whether the output 3 is the continuous output or the ON/OFF output.
When the output 3 is the continuous output, configure the settings as shown below in the output bank (out) setup.
In this example, an MV of 0 to 100 % on the slave side is output as 4 to 20 mA.

Display item	Auxiliary display	Item name	Settings
Co-01	3.	(Output 3) Output range	0:4 to 20mA
Co-02	3.	(Output 3) Output type	1:MV
Co-03	3.	(Output 3) Loop/channel definition	2
Co-04	3.	(Output 3) Decimal point position	1: One digit after the decimal point
Co-05	3.	(Output 3) Low limit of output scaling	0.0
Co-06	3.	(Output 3) High limit of output scaling	100.0
Co-07	3.	(Output 3) Linearization table group definition	0: Not used.

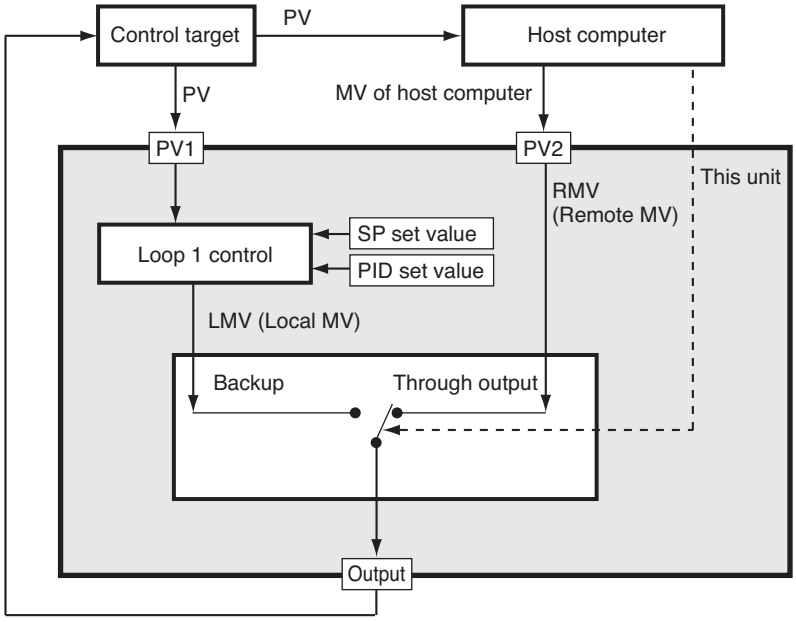
When the output 3 is the ON/OFF output, configure the settings as shown below in the output bank (oUt) setup.
In this example, the setting with the controllability priority is made assuming that the time proportional cycle time is 10 s.

Display item	Auxiliary display	Item name	Settings
tPo.01	3.	(Output 3) Output type	4: MV of loop 2
tPo.02	3.	(Output 3) Latch	(setting is disabled.)
tPo.03	3.	(Output 3) Time proportional operation type	0: Priority on controllability
tPo.04	3.	(Output 3) Min. ON/OFF time	250 (unit: ms)
tPo.05	3.	(Output 3) Time proportional cycle	10.0 (unit: s)
tPo.06	3.	(Output 3) Linearization table group definition	0: Not used.

7 - 2 Computer Backup

When this unit is a 2-input model, the computer backup function can be used.
The computer backup function provides two modes as described below.

- Through output mode
  The host computer performs the control operation. The MV of the host computer is received by the PV2 input of this unit and it is output as MV of this unit.
- Backup mode
  This unit performs the control operation instead of the host computer. The PV1 input is used as PV of the loop 1.



Handling Precautions

- The computer backup function can be used only when this unit is a 2-input model. The 1-input model cannot use this function.

■ Setting banks

Setup bank (SETUP)
Priority bank (PrLor)
Internal contact input bank (iC)
Output bank (oUt)

■ Example

The following describes an example that the terminal status of the DI-F1 (F1 of digital input) is used to change to the computer backup and the MV is output to the output 3:

(1) Configure the settings so that the computer backup function can be used.
Configure the settings as shown below in the setup bank (SETUP) setup.

Display item	Auxiliary display	Item name	Settings
C-001	No display	Loop type	3: Computer backup
C-002	No display	Computer backup type	0: Computer backup method 1

The operation when the through output is changed to the backup may vary depending on the type of computer backup as described below.
Method 1: The LSP becomes the same value as the PV. A change in MV is small.
Method 2: The LSP does not change. A change in MV is large.
Method 3: The LSP does not change. A change in MV is small.

(2) Using the priority setup, configure the settings so that the mode of the computer backup is changed by the internal contact input.
Configure the settings as shown below in the priority bank (*Prior*) setup.

Display item	Auxiliary display	Item name	Setting
LPr.06	*1.*	(Loop 1) Backup/through output	1: Internal contact input priority

(3) Configure the settings as shown below in the internal contact input bank (*IC*) so that the mode of the computer backup is changed by the terminal status of DI-F1 (F1 of digital input).

Display item	Auxiliary display	Item name	Settings
IC-01	*01.*	(Internal contact 1 group) Operation type	25: Backup/through output selection
IC-02	*01.*	(Internal contact 1 group) Input type	1176:DI-F1
IC-03	*01.*	(Internal contact 1 group) Loop/channel definition	1
IC-04	*01.*	(Internal contact 1 group) Weighting	(setting is invalid.)

(4) The MV of loop 1 is output from the output 3. The setup items may vary depending on whether the output 3 is the continuous output or the ON/OFF output.
When the output 3 is the continuous output, configure the settings as shown below in the output bank (*oUt*) setup. In this example, an MV of 0 to 100 % on the slave side is output as 4 to 20 mA.

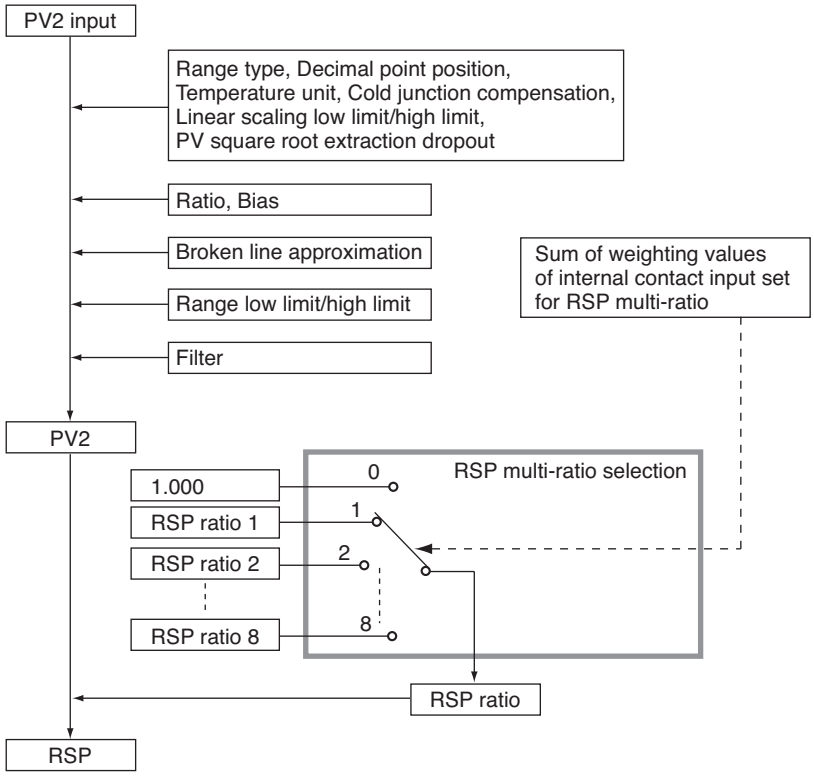
Display item	Auxiliary display	Item name	Settings
Co-01	*3.*	(Output 3) Output range	0:4 to 20 mA
Co-02	*3.*	(Output 3) Output type	1:MV
Co-03	*3.*	(Output 3) Loop/channel definition	1
Co-04	*3.*	(Output 3) Decimal point position	1: One digit after the decimal point
Co-05	*3.*	(Output 3) Low limit of output scaling	0.0
Co-06	*3.*	(Output 3) High limit of output scaling	100.0
Co-07	*3.*	(Output 3) Linearization table group definition	0: Not used.

When the output 3 is the ON/OFF output, configure the settings as shown below in the output bank (*oUt*) setup. In this example, the setting with the controllability priority is made assuming that the time proportional cycle time is 10 s.

Display item	Auxiliary display	Item name	Settings
tPo.01	*3.*	(Output 3) Output type	1: MV of loop 1
tPo.02	*3.*	(Output 3) Latch	(setting is disabled.)
tPo.03	*3.*	(Output 3) Time proportional operation type	0: Priority on controllability
tPo.04	*3.*	(Output 3) Min. ON/OFF time	250 (unit: ms)
tPo.05	*3.*	(Output 3) Time proportional cycle	10.0 (unit: s)
tPo.06	*3.*	(Output 3) Linearization table group definition	0: Not used.

7 - 3 RSP Multi-Ratio

When this unit is a 2-input model and the 1-loop control with RSP is performed, the RSP multi-ratio function can be used.
The RSP multi-ratio function uses a ratio selected from multiple RSP ratio settings by the internal contact input. The RSP is calculated using the following calculation formula:
RSP = PV2 × RA
The RA is a value of the selected RSP ratio.
However, when the sum of weighting values of the internal contact input is "0" or when the multi-ratio selection setting does not exist in the internal contact input, the RA becomes "1.000" (RA = 1.000).
Additionally, since the number of RSP ratio settings is "8", RSP ratio 8 is selected if the sum of weighting values of the internal contact input is "9" or more.



Handling Precautions

- The RSP multi-ratio function can be used only when this unit is a 2-input model. The 1-input model cannot use the RSP multi-ratio function.

■ Setting banks

SP configuration bank (SPCnF)
Internal contact input bank (iC)

■ Example

The following describes an example that the ratio selection is used from "0.100" to "0.700" in steps of "0.100" using three digital inputs, C-column 1 to C-column 3:

(1) Set the multi-ratio.
Configure the settings as shown below in the SP configuration bank (SPCnF) setup. (In this example, the RSP ratio 8 is not used.)

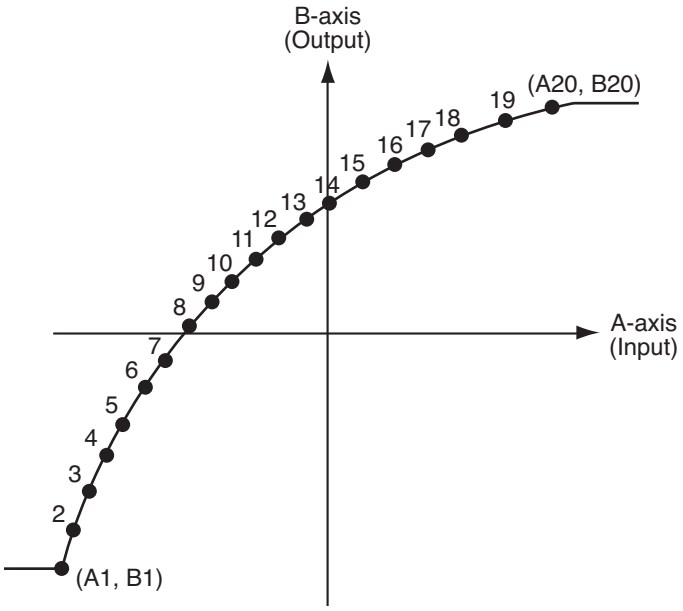
Display item	Auxiliary display	Item name	Settings
rrR.01	L.1.	(Loop 1) RSP ratio 1	0.100
rrR.02	L.1.	(Loop 1) RSP ratio 2	0.200
rrR.03	L.1.	(Loop 1) RSP ratio 3	0.300
rrR.04	L.1.	(Loop 1) RSP ratio 4	0.400
rrR.05	L.1.	(Loop 1) RSP ratio 5	0.500
rrR.06	L.1.	(Loop 1) RSP ratio 6	0.600
rrR.07	L.1.	(Loop 1) RSP ratio 7	0.700
rrR.08	L.1.	(Loop 1) RSP ratio 8	1.000

(2) In the internal contact input setup bank (IC), configure the settings so that the multi-ratio selection uses the digital inputs C-column 1 to C-column 3.

Display item	Auxiliary display	Item name	Settings
IC-01	01.	(Internal contact 1 group) Operation type	4: Multi-ratio selection
IC-02	01.	(Internal contact 1 group) Input type	1152:DI-C1
IC-03	01.	(Internal contact 1 group) Loop/channel definition	1
IC-04	01.	(Internal contact 1 group) Weighting	1
IC-01	02.	(Internal contact 2 group) Operation type	4: Multi-ratio selection
IC-02	02.	(Internal contact 2 group) Input type	1153:DI-C2
IC-03	02.	(Internal contact 2 group) Loop/channel definition	1
IC-04	02.	(Internal contact 2 group) Weighting	2
IC-01	03.	(Internal contact 3 group) Operation type	4: Multi-ratio selection
IC-02	03.	(Internal contact 3 group) Input type	1154:DI-C3
IC-03	03.	(Internal contact 3 group) Loop/channel definition	1
IC-04	03.	(Internal contact 3 group) Weighting	4

7 - 4 Approximation by Linearization Table

This unit can use an approximation by linearization table for the PV input or continuous output.
There are eight groups of linearizations. One linearization group has 20-point settings.
Settings A1 to A20 are input values for the approximation by linearization table while settings B1 to B20 are output values for the approximation by linearization table. They are shown as a graph in the figure below.
When the input is A1 or less, the output becomes B1.
When the input is A20 or more, the output becomes B20.



■ Approximation by linearization table of output

To use the approximation by linearization table for the continuous output, configure the settings in the linearization table use group for OUT of the priority bank (Pr-02) so that the linearization group is selected by the set value or the internal contact input.

■ Setting banks

PV bank (Pv)
Linearization table bank (tbL)

■ Example

The following describes an example that the approximation by linearization table of the linearization table 1 group is used for the PV1 input:
An input ranging from "0.0" to "100.0" is converted into other characteristic of "0.0" to "100.0".

(1) Specify a group of the linearization table using the PV input.
Configure the settings as shown below in the PV bank (Pv) setup.

Display item	Auxiliary display	Item name	Setting
Pv-20	1.	(PV1 input) Linearization table group definition	1: 1 group

(2) Set the linearization table.

Configure the settings as shown below in the linearization table bank (bbL) setup.

Display item	Auxiliary display	Item name	Settings
bb.dP	1.	(Linearization table 1 group) Breakpoint decimal point point	1: One digit below the decimal position
bb.A.01	1.	(Linearization table 1 group) Breakpoint A1	0.0
bb.A.02	1.	(Linearization table 1 group) Breakpoint A2	17.4
bb.A.03	1.	(Linearization table 1 group) Breakpoint A3	25.0
(Omission)			
bb.A.18	1.	(Linearization table 1 group) Breakpoint A18	75.0
bb.A.19	1.	(Linearization table 1 group) Breakpoint A19	82.6
bb.A.20	1.	(Linearization table 1 group) Breakpoint A20	100.0
bb.b.01	1.	(Linearization table 1 group) Breakpoint B1	0.0
bb.b.02	1.	(Linearization table 1 group) Breakpoint B2	10.0
bb.b.03	1.	(Linearization table 1 group) Breakpoint B3	15.0
(Omission)			
bb.b.18	1.	(Linearization table 1 group) Breakpoint B18	85.0
bb.b.19	1.	(Linearization table 1 group) Breakpoint B19	90.0
bb.b.20	1.	(Linearization table 1 group) Breakpoint B20	100.0

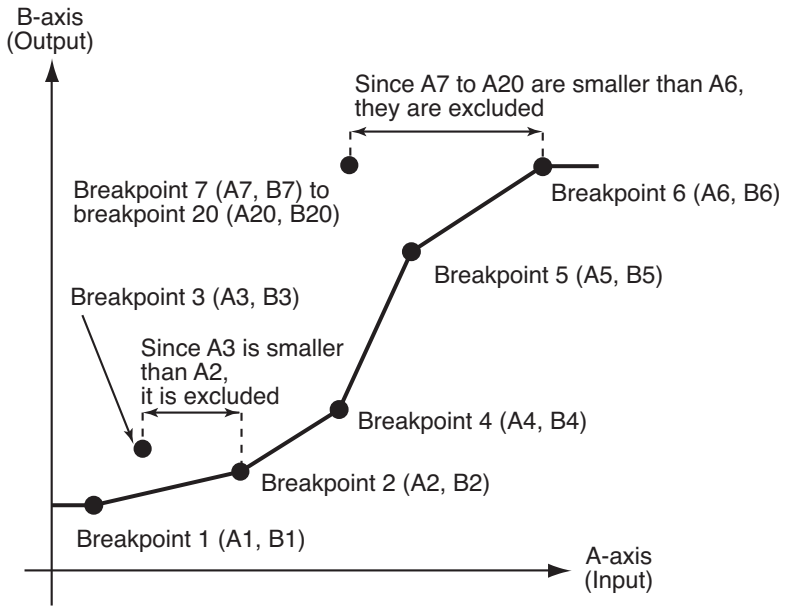
The decimal point position used to set breakpoints A1 to 20 and breakpoints B1 to 20 is specified using the breakpoint decimal point position (bb.dP).

■ Magnitude correlation of breakpoint A setting is not the numerical order.

Linearization is written except for deviation points.

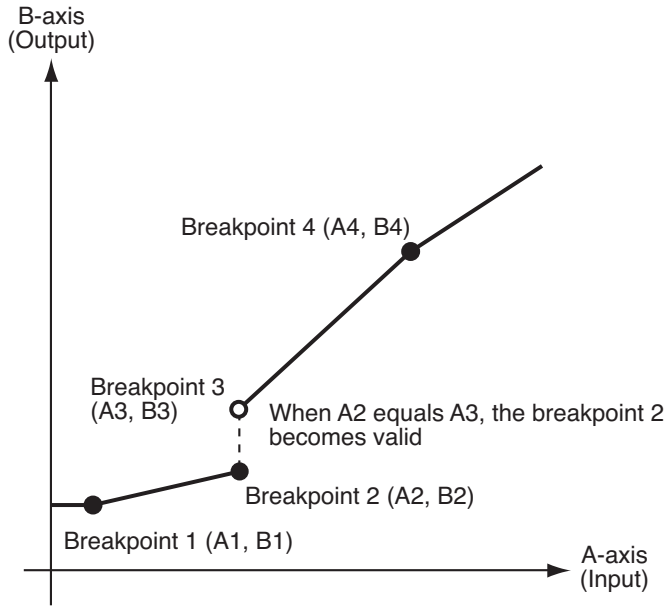
It is possible not to use the breakpoint located halfway. (breakpoint 3 shown in the figure below.)

It is possible not to use the excess breakpoints. (breakpoints 7 to 20 shown in the figure below.)



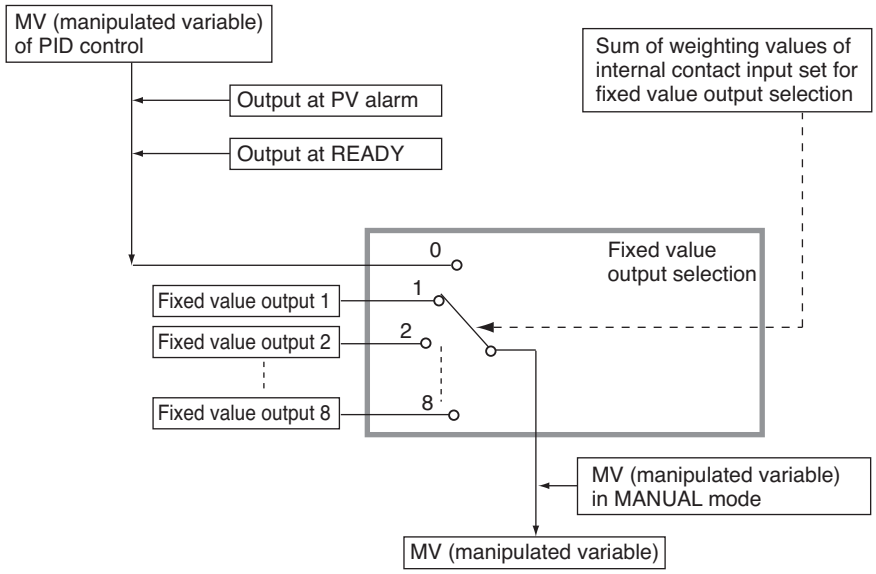
■ A options of the adjacent breakpoints are the same.

A breakpoint having a smaller No. becomes valid. Additionally, the two points are not connected by a linearization.



7 - 5 Fixed Value Output

This unit can use a fixed value selected by the internal contact input instead of the MV (manipulated variable) of the PID control. Eight fixed value outputs are set for each loop.
However, when the sum of weighting values of the internal contact inputs is "0" or when the fixed value group selection setting is not provided on the internal contact input, the fixed value output cannot be used.
Additionally, since the number of fixed value output settings is "8", the fixed value output 8 is selected if the sum of weighting values of the internal contact inputs is "9" or more.
The priority of the fixed value output is higher than the MV of the PID control, Output at PV alarm, Output at READY, Output at READY (heat), Output at READY (cool), and through output of computer backup, but it is lower than the MV in the MANUAL mode.



■ Setting banks

MV bank (mv)
Internal contact input bank (iC)

■ Example

The following describes an example that the fixed value output selection is used from "10.0 %" to "70.0 %" in steps of "10.0" using three digital inputs, C-column 1 to C-column 3:

(1) Set the fixed value output.
Configure the settings as shown below in the MV bank setup (in this example, the fixed value output 8 is not used).

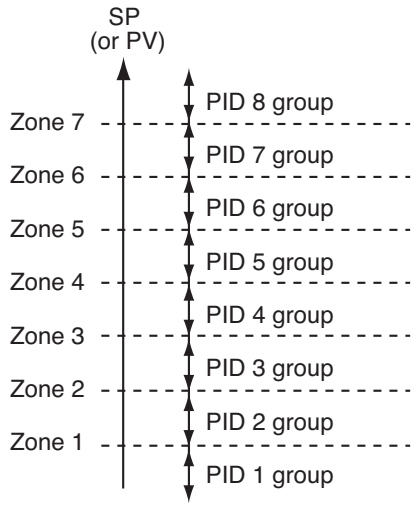
Display item	Auxiliary display	Item name	Settings
mv-08	L.1.	(Loop 1) Fixed value output 1	10.0
mv-07	L.1.	(Loop 1) Fixed value output 2	20.0
mv-08	L.1.	(Loop 1) Fixed value output 3	30.0
mv-09	L.1.	(Loop 1) Fixed value output 4	40.0
mv-10	L.1.	(Loop 1) Fixed value output 5	50.0
mv-11	L.1.	(Loop 1) Fixed value output 6	60.0
mv-12	L.1.	(Loop 1) Fixed value output 7	70.0
mv-13	L.1.	(Loop 1) Fixed value output 8	0.0

(2) In the internal contact input bank (IC), configure the settings so that the fixed values are selected using the digital inputs, C-column 1 to C-column 3.

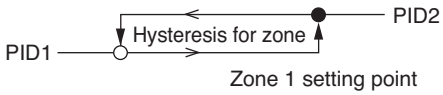
Display item	Auxiliary display	Item name	Settings
IC-01	01.	(Internal contact 1 group) Operation type	3: Fixed value output selection
IC-02	01.	(Internal contact 1 group) Input type	1152:DI-C1
IC-03	01.	(Internal contact 1 group) Loop/channel definition	1
IC-04	01.	(Internal contact 1 group) Weighting	1
IC-01	02.	(Internal contact 2 group) Operation type	3: Fixed value output selection
IC-02	02.	(Internal contact 2 group) Input type	1153:DI-C2
IC-03	02.	(Internal contact 2 group) Loop/channel definition	1
IC-04	02.	(Internal contact 2 group) Weighting	2
IC-01	03.	(Internal contact 3 group) Operation type	3: Fixed value output selection
IC-02	03.	(Internal contact 3 group) Input type	1154:DI-C3
IC-03	03.	(Internal contact 3 group) Loop/channel definition	1
IC-04	03.	(Internal contact 3 group) Weighting	4

7 - 6 Zone PID

This unit can perform the PID control using the zone PID function. The zone PID is a function that selects a PID constant group from group 1 to 8 according to the SP value or PV value.



The following shows the operation at the change-over point between zones. The change-over between the PID1 and PID2 is described as an example:



● means that the PID group is changed by this value.
○ means that the PID group is changed at a point where 1U elapses from this value.

! Handling Precautions

- The zone PID function can be used only when the recipe enabled (C-10) setup is "0" (multi-SP). When the setting is "1" (recipe), this function cannot be used.
  Additionally, 16 PID constant groups are provided for each loop. However, when using the zone PID, only groups 1 to 8 can be used.

■ Setting banks

Setup bank (SEtUP)
Priority bank (PrLor)
Control bank (CtrL)

■ Example

The following describes an example that the zone PID function is used with PV from 100 °C in steps of 100 °C in the loop 1:

(1) Set the multi-SP.
Configure the settings as shown below in the setup bank (SEtUP) setup.

Display item	Auxiliary display	Item name	Setting
C-10	No display	Recipe enabled	0: Multi-SP

(2) Set the priority of the PID group selection.

Configure the settings as shown below in the priority bank (Prior) setup.

Display item	Auxiliary display	Item name	Setting
LPr.02	1.	(Loop 1) PID group selection	0: Zone PID function priority

(3) Set a zone.

Configure the settings as shown below in the control bank (CtrL) setup.

Set the zones 1 to 7 so that they become larger sequentially.

The hysteresis for the zone is used when the zone is moved to that having a number, which is 1 smaller than the current number. Set a value, which is sufficiently smaller than the width of each zone.

Display item	Auxiliary display	Item name	Settings
Etd.12	L.1.	(Loop 1) Zone operation selection	1: Selection with PV value.
Etd.13	L.1.	(Loop 1) Zone 1	100.0
Etd.14	L.1.	(Loop 1) Zone 2	200.0
Etd.15	L.1.	(Loop 1) Zone 3	300.0
Etd.16	L.1.	(Loop 1) Zone 4	400.0
Etd.17	L.1.	(Loop 1) Zone 5	500.0
Etd.18	L.1.	(Loop 1) Zone 6	600.0
Etd.19	L.1.	(Loop 1) Zone 7	700.0
Etd.20	L.1.	(Loop 1) Hysteresis for zone	5.0

7 - 7 Function Keys

This unit can set the mode change-over for keys shown in the Table below. Up to eight data settings can be assigned. This function is called "function key (F key) function".

Key	Applicable model No.		Initial value of F key basic registration setting (FK-01)	Setting range of F key basic registration setting (FK-01)
	SDC45A	SDC46A		
rsp/lsp	○	○	5: RSP/LSP selection	0: No registration, 1: Item setting, 2: RUN/READY selection, 3: Undefined., 4: AT start/stop selection, 5: RSP/LSP selection, 6: Backup/through output selection, 7 to 14: User defined bits 1 to 8 selection
at	○	○	4: AT start/stop selection	
f1	×	○	0: No registration	
f2	×	○	0: No registration	

■ Setting banks

Priority bank (Prior)
Display/key bank (Main)

■ Example 1

The following describes an example that the RUN/READY mode selection is set for the [rsp/lsp] key:

(1) Set the priority of the RUN/READY selection.
Configure the settings as shown below in the priority bank (Prior) setup.

Display item	Auxiliary display	Item name	Settings
LPr.03	1.	(Loop 1) RUN/READY selection	0: Set value priority
LPr.03	2.	(Loop 2) RUN/READY selection	0: Set value priority

When the loop type is 1-loop, "Loop 2 RUN/READY selection" cannot be set.

(2) Set "RUN/READY selection" for the [rsp/lsp] key.
Configure the settings as shown below in the display/key bank (Main) setup.

Display item	Auxiliary display	Item name	Settings
FK-01	1.	([rsp/lsp] key) F key basic registration	2: RUN/READY selection
FK-02	1.	([rsp/lsp] key) F key assignment item 1	(setting is invalid.)
FK-03	1.	([rsp/lsp] key) F key assignment item 2	(setting is invalid.)
FK-04	1.	([rsp/lsp] key) F key assignment item 3	(setting is invalid.)
FK-05	1.	([rsp/lsp] key) F key assignment item 4	(setting is invalid.)
FK-06	1.	([rsp/lsp] key) F key assignment item 5	(setting is invalid.)
FK-07	1.	([rsp/lsp] key) F key assignment item 6	(setting is invalid.)
FK-08	1.	([rsp/lsp] key) F key assignment item 7	(setting is invalid.)
FK-09	1.	([rsp/lsp] key) F key assignment item 8	(setting is invalid.)

The following shows the relationship between the auxiliary display and key:
Auxiliary display: "1.", [rsp/lsp] key
Auxiliary display: "2.", [at] key
Auxiliary display: "3.", [f1] key
Auxiliary display: "4.", [f2] key

(3) When the settings have been completed, check the operation.
First, press the [display] key to show the operation display screen.
Next, press the [rsp/lsp] key and check that "rUn" or "rdY" on the lower display starts flashing.
Subsequently, when the [rsp/lsp] key is kept pressed, the flashing of "rUn" or "rdY" on the lower display is stopped and the READY/RUN mode is then changed.

■ Example 2

The following describes an example that the setup items, "SP low limit of loop 1" and "SP high limit of loop 1", are assigned to the [at] key:

(1) Assign the setup items to the [at] key.
Configure the settings as shown below in the display/key bank (Hñi) setup.
Values to be set for the F key assignment items 1 to 8 are communication data address of the data to be assigned (for RAM).

Display item	Auxiliary display	Item name	Settings
FA-01	2.	([at] key) F key basic registration	1: Item setting
FA-02	2.	([at] key) F key assignment item 1	010A0 (SP low limit of loop 1)
FA-03	2.	([at] key) F key assignment item 2	010A1 (SP high limit of loop 1)
FA-04	2.	([at] key) F key assignment item 3	00000 (invalid)
FA-05	2.	([at] key) F key assignment item 4	00000 (invalid)
FA-06	2.	([at] key) F key assignment item 5	00000 (invalid)
FA-07	2.	([at] key) F key assignment item 6	00000 (invalid)
FA-08	2.	([at] key) F key assignment item 7	00000 (invalid)
FA-09	2.	([at] key) F key assignment item 8	00000 (invalid)

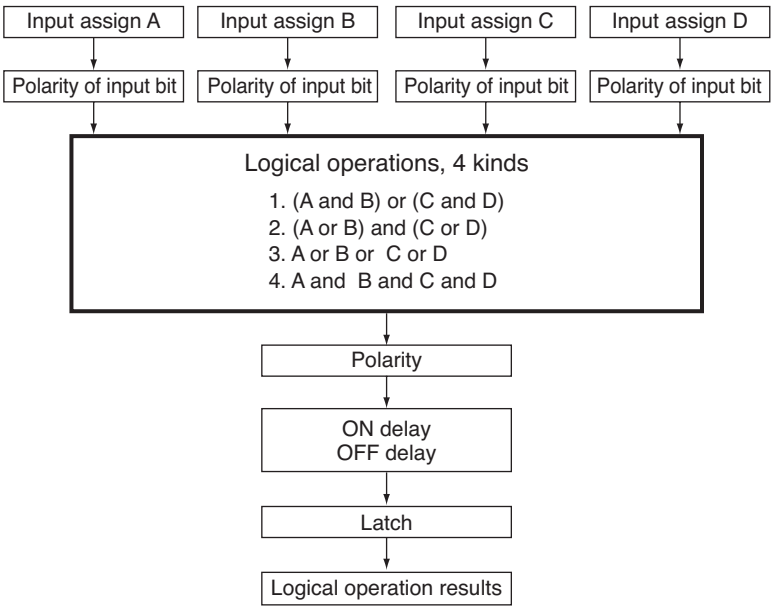
Since the communication data address is hexadecimal data, alphabetic characters A to F are also used in addition to numeric values. When the setting is changed with the F key, the data in both the RAM and EEPROM is changed accordingly.

The following shows the relationship between the auxiliary display and key:
Auxiliary display: "1.", [rsp/lsp] key
Auxiliary display: "2.", [at] key
Auxiliary display: "3.", [f1] key
Auxiliary display: "4.", [f2] key

(2) When the settings have been completed, check the operation.
First, press the [display] key to show the operation display screen.
Next, check that the display changes to the "SP low limit of loop 1" setting when the [at] key is kept pressed for 2 s.
Check that the display changes to the "SP high limit of loop 1" setting when the [at] key is pressed again.

7 - 8 Logical Operations

This unit can perform the logical operation (Boolean operation consisting of "0" and "1") corresponding to various instrument statuses and can use the logical operation results as ON/OFF outputs or internal contact inputs.
16 groups of logical operations are provided. One operation group consists of four inputs and one output.
Four kinds of logical operations are provided. Furthermore, the input or output logic can be inverted.



■ Processing sequence for logical operations

Certain logical operation results can be used as inputs of the logical operation in the same group or different group. The operating process of the logical operation is performed at intervals of sampling cycles in the group No. order.
Therefore, the logical operation results of a smaller group No. can be used in the same sampling cycle. The logical operation results of the same group No. or a lager group No. are used in the next sampling cycle.

■ Setting banks

Logical operation bank (bF)
Output bank (oUt)

■ Example

The following describes an example that output 1 is turned ON when any of the event 1, event 2, and alarm indication is turned ON using the logical operation 1 group:

(1) Set the logical operation.
Configure the settings as shown below in the logical operation bank (bF) setup in the status that the auxiliary display shows 01. (group 1).

Display item	Auxiliary display	Item name	Settings
bF-01	01.	(Logical operation group 1) Operation type	3: Operation 3 (A or B or C or D)
bF-02	01.	(Logical operation group 1) Input assign A	1088: Event 1
bF-03	01.	(Logical operation group 1) Input assign B	1089: Event 2
bF-04	01.	(Logical operation group 1) Input assign C	1792: Representative of all alarms
bF-05	01.	(Logical operation group 1) Input assign D	1024:OFF
bF-06	01.	(Logical operation group 1) Input bit polarity A	0: Direct
bF-07	01.	(Logical operation group 1) Input bit polarity B	0: Direct
bF-08	01.	(Logical operation group 1) Input bit polarity C	0: Direct
bF-09	01.	(Logical operation group 1) Input bit polarity D	0: Direct
bF-10	01.	(Logical operation group 1) ON delay time	0.0 (unit: s)
bF-11	01.	(Logical operation group 1) OFF delay time	0.0 (unit: s)
bF-12	01.	(Logical operation group 1) Reverse	0: Direct
bF-13	01.	(Logical operation group 1) Latch	0: Not latched.

(2) Set the results of the logical operation 1 for the output 1.
Configure the settings as shown below in the output bank (oUt) setup.

Display item	Auxiliary display	Item name	Settings
tPo.01	1.	(Output 1) Output type	1440: Results of logical operation 1
tPo.02	1.	(Output 1) Latch	0: Not latched.
tPo.03	1.	(Output 1) Time proportional operation type	(setting is disabled.)
tPo.04	1.	(Output 1) Min. ON/OFF time	250 (unit: ms)
tPo.05	1.	(Output 1) Time proportional cycle	(setting is disabled.)
tPo.06	1.	(Output 1) Linearization table group definition	(setting is disabled.)

Chapter 8. LIST OF SETTINGS

8 - 1 PARA Banks

☞ SDC45A/46A Digital Indicating Controller Displays and Settings (CP-SP-1265E).

8 - 2 SP/EV Banks

☞ SDC45A/46A Digital Indicating Controller Displays and Settings (CP-SP-1265E).

Chapter 9. CPL COMMUNICATION FUNCTION

9 - 1 Outline of Communication

If the optional model is provided with the RS-485 communication function, communication with a PC, PLC or other host devices are available using a user-configured program.
The communication protocol of this unit is the Controller Peripheral Link (CPL) communication. This chapter describes the CPL communications.

■ Features

The features of the SDC45/46's communication function are as follows:

- Up to 31 units can be connected to a single master station as a host device.
- When the communication specifications of the host device conform to the RS-232C interface, the communication converter CMC10L (sold separately) is required. The CMC10L allows the conversion between RS-232C and RS-485.
- Almost all of the device parameters can be communicated.
  For details on communication parameters, refer to:
  ☞ Chapter 10, LIST OF COMMUNICATION DATA.
- Random access commands are available.
  Two or more number of parameters at separated addresses can be read or written by a single command.

■ Setup

The following setups are required for performing the CPL communications.
The items on the table below can be displayed and set up only when the optional model number is provided with the RS-485 communication function.

Item name (RS-485 communication bank)	Item display	Contents of setup	Initial value
Station address	Con.02	0: Does not communicate 1 to 127	0
Transmission speed	Con.03	0: 4800bps 1: 9600bps 2: 19200bps 3: 38400bps	2
Data format (Data length)	Con.04	0: 7 bits 1: 8 bits	1
Data format (Parity)	Con.05	0: Even parity 1: Odd parity 2: No parity	0
Data format (Stop bit)	Con.06	0: 1 stop bit 1: 2 stop bits	0
Response time-out	Con.07	1 to 250ms	3

[!] Handling Precautions

- Setups can be performed through key operation on this unit or the SLP-C45 Smart Loader Package. However, they cannot be performed via RS-485 communications.
- If you use the Yamatake CMC10L as an RS-232C/RS-485 converter, set the response time-out (Con.07) to 3 ms or longer.

■ Communication procedures

The communication procedure is as follows:

(1) The instruction message is sent from the host device (master station) to one unit (slave station) to communicate with.

(2) The slave station receives the instruction message, and performs read or write processing according to the content of the message.

(3) The slave station sends a message corresponding to the processing content as a response message.

(4) The master station receives the response message.

Handling Precautions

It is not allowed to use two or more number of protocols together on a single RS-485 transmission line (such as CPL, MODBUS ASCII format, and MODBUS RTU format).

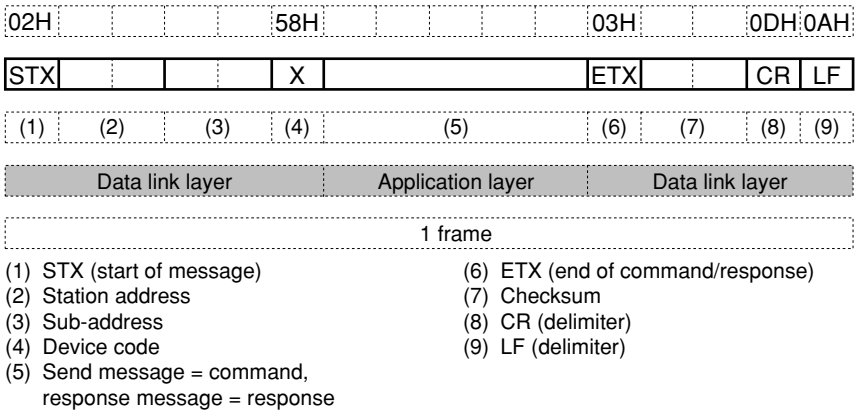
9 - 2 Message Structure

■ Message structure

The following shows the message structure.
Messages are broadly classified into two layers: the data link layer and the application layer.

- Data link layer
  This layer contains the basic information required for the communication such as the destination of the communication message and the check information of the message.
- Application layer
  Data is read and written in this layer. The content of the layer varies according to the purpose of the message.

Messages comprise parts (1) to (9) as shown in the figure below.
The command (details sent from the master station) and the response (details returned from the slave station) are stored in the application layer.



(1) STX (start of message)
(2) Station address
(3) Sub-address
(4) Device code
(5) Send message = command, response message = response
(6) ETX (end of command/response)
(7) Checksum
(8) CR (delimiter)
(9) LF (delimiter)

■ Data link layer

● Outline

The data link layer is of a fixed length. The position of each data item and the number of its characters are already decided. Note, however, that the data positions of the data link layer from ETX onwards shift according to the number of characters in the application layer.

● Response start conditions

- The device sends the response message only when message structure in the data link layer is all correct. If even one of these is incorrect, no response messages are sent, and the device waits for new message.

● List of data link layer data definitions

The following list shows the definitions for data in the data link layer:

Data name	Character code	Number of characters	Meaning of data
STX	02H	1	Start of message
Station address	0 to 7FH are expressed as hexadecimal character codes.	2	Identification of device to communicate with
Sub-address	"00" (30H, 30H)	2	No function
Device code	"X" (58H) or "x" (78H)	1	Device type
ETX	03H	1	End position of the application layer
Checksum	00H to FFH are expressed as two-digit hexadecimal character codes.	2	Checksum of message
CR	0DH	1	End of message (1)
LF	0AH	1	End of message (2)

● Description of data items

- STX (02H)
  When STX is received, the device judges this to be the start of the send message. For this reason, the device returns to the initial state whatever reception state it was in, and processing is started on the assumption that the STX, the first character, has been received. The purpose of this is to enable recovery of the device's response at the next correct message (e.g. RETRY message) from the master station in the event that noise, for example, causes an error in the sent message.
- Station address
  Of the messages sent by the master station, the device creates response messages only when station addresses are the same. Station addresses in the messages are expressed as two-digit hexadecimal characters.
  The station address is set up by the station address of the RS-485 communication bank (item display:). However, when the station address is set to 0 (30H 30H), the device creates no response even if station addresses match.
  The device returns the same station address as that of the received message.
- Sub-address
  The C35/36 does not use the sub-address. For this reason, set "00" (30H 30H).
  The device returns the same sub-address as that of the received message.
- Device code
  The device sets X (58H) or x (78H) as the device code. This code is determined for each device series, and other codes cannot be selected. The device returns the same device code as that of the received message. X (58H) is used as the default, and x (78H) is used for judging the message as the resend message.
- ETX
  ETX indicates the end of the application layer.
- Checksum
  This value is for checking whether or not some abnormality (e.g. noise) causes the message content to change during communications.
  The checksum is expressed as two hexadecimal characters.
- How to calculate a checksum
  (1) Add the character codes in the message from STX through ETX in single byte units.
  (2) Take two's complement of the low-order one byte of the addition result.

(2) Take two's complement of the low-order one byte of the addition result.
(3) Convert the obtained two's complement to a two-byte ASCII code.

The following is a sample checksum calculation for a sample message:

STX: 02H
'0': 30H (first byte of the station address)
'1': 31H (second byte of the station address)
'0': 30H (first byte of the sub-address)
'0': 30H (second byte of the sub-address)
'X': 58H (device code)
'R': 52H (first byte of the command)
'D': 44H (second byte of the command)
(omitted)
ETX: 03H

(1) Add the character codes in the message from STX through ETX in single byte units.
The addition operation in single byte units is as follows:
02H + 30H + 31H + 30H + 30H + 58H + 52H + 53H + • • • + 03H.
Assume that the result is 376H.
(2) The low-order one byte of the addition result 376H is 76H. The two's complement of 76H is 8AH.
(3) Convert the obtained 8AH to a two-byte ASCII code.
The result is:
'8': 38H
'A': 41H,
and the two bytes, '8'(38H) and 'A'(41H), are the checksum.

- CR/LF
This indicates the end of the message. Immediately after LF is received, the device enters a state allowed to process the received message.

■ Application layer

The table below shows the configuration of the application layer.

Item	Description
Command	"RD" (hex format continuous address data read command)
	"WD" (hex format continuous address data write command)
	"RU" (hex format random address data read command)
	"WU" (hex format random address data write command)
Data delimiter	None
Word address	Numeric value in hex notation, such as "01F5".
Read count	Numeric value in hex notation, such as "0001".
Numerical value to be written	Numeric value in hex notation, such as "0001".

• Number of data accessible by a single frame.

Type	Description of command	RAM area	EEPROM
RD	Hex format read command	16	16
WD	Hex format write command	16	16
RU	Hex format random read command	16	16
WU	Hex format random write command	16	16

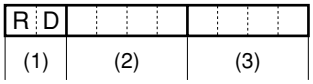
9 - 3 Description of Commands

■ Fixed length continuous data read command (RD command)

This command reads continuous data in two-byte units. This command is suitable for handling data in ladder programs sent by PLC communications as the data is of a fixed length.
The start data address is expressed as four hexadecimal digits. The number of read data is expressed as four digits, and data is expressed as four X n (n is a positive integer) hexadecimal digits.

● Send message

The read start data address (four hexadecimal digits) and the number of read data (four hexadecimal digits) are sent.

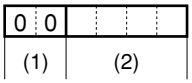


(1) Fixed length continuous data read command
(2) Start data address
(3) Number of read data

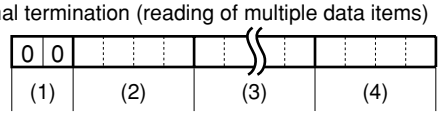
● Response message

If the message is sent successfully, the termination code is taken to be normal (two decimal digits) and returned appended with the number of read data (four hexadecimal digits X number of read data) specified by the command. If message transmission ends in error, the termination code is taken to be in error (two decimal digits) and returned without the read data.

• Normal termination (reading of single data item)



• Normal termination (reading of multiple data items)



• Abnormal termination



The abnormal termination code is entered at XX.
For details of codes, refer to:
☞ 9-6, List of Termination Codes (on page 9-12).

(1) Termination code
(2) Data
(3) Data 2 to data (n-1)
(4) Data n

● Maximum number of read data per message

Up to 16 items for both RAM and EEPROM area

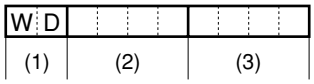
■ Fixed length continuous data write command (WD command)

This command writes continuous data in two-byte units. This command is suitable for handling data in ladder programs sent by PLC communications as the data is of a fixed length.
The start data address is expressed as four hexadecimal digits. Data is expressed as four X n (n is a positive integer) hexadecimal digits.

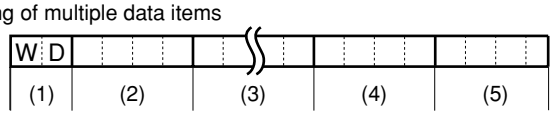
● Send message

The write start data address (four hexadecimal digits) and the number of write data (four X n hexadecimal digits) are sent.

• Writing of single data item



• Writing of multiple data items



(1) Fixed length continuous data write command
(2) Start data address
(3) Data 1
(4) Data 2 to data (n-1)
(5) Data n

● Response message

If writing is successful, the normal termination code (two decimal digits) is returned. If only part of the data is written, and the remaining data is not written, the warning termination code (two decimal digits) is returned. If none of the data is written, the abnormal termination code (two decimal digits) is returned.

• Normal termination



• Abnormal termination or warning



The abnormal termination code is entered at XX.
For details of codes, refer to:
☞ 9-6, List of Termination Codes (on page 9-12).

(1) Termination code

● Maximum number of write data per message

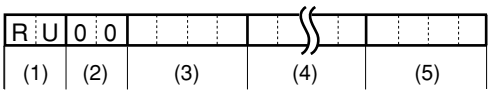
Up to 16 items for both RAM and EEPROM area

■ Fixed length random data read command (RU command)

This command reads random data in two-byte units.

● Send message

The data address (four hexadecimal digits) of the data to be read is sent in the specified order.

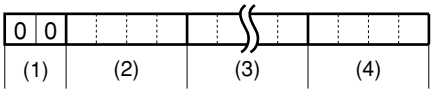


(1) Fixed length random data write command
(2) Sub-command: fixed to "00".
(3) Data address 1
(4) Data address 2 to data address (n-1)
(5) Data address n

● Response message

If the message is sent successfully, the termination code is taken to be normal (two decimal digits) and returned appended with the number of read data (four hexadecimal digits X number of read data) specified by the command. If message transmission ends in error, the termination code is taken to be in error (two decimal digits) and returned without the read data.

• Normal termination



• Abnormal termination



The abnormal termination code is entered at XX.
For details of codes, refer to:
☞ 9-6, List of Termination Codes (on page 9-12).

(1) Termination code
(2) Data 1
(3) Data 2 to data (n-1)
(4) Data n

● Maximum number of read data per message

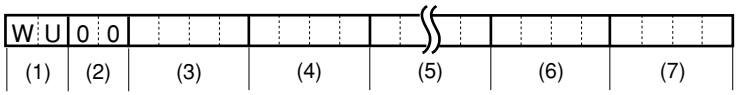
Up to 16 items for both RAM and EEPROM area

■ Fixed length random data write command (WU command)

This command writes data to random addresses in two-byte units. Data is expressed in four hexadecimal digits.

● Send message

Data is sent for the specified number of write data with the data address (four hexadecimal digits) of the data to be written and the data (four hexadecimal digits) as a pair.



(1) Fixed length random data write command
(2) Sub-command: fixed to "00".
(3) Data address 1
(4) Write data 1
(5) Data address, write data 2 to write data (n-1)
(6) Data address n
(7) Write data n

● Response message

If writing is successful, the normal termination code (two decimal digits) is returned. If only part of the data is written, and the remaining data is not written, the warning termination code (two decimal digits) is returned. If none of the data is written, the abnormal termination code (two decimal digits) is returned.

• Normal termination



• Abnormal termination or warning



The abnormal termination code is entered at XX.
For details of codes, refer to:
☞ 9-6, List of Termination Codes (on page 9-12).

(1) Termination code

● Maximum number of write data per message

Up to 16 items for both RAM and EEPROM area

9 - 4 Definition of Data Addresses

● **RAM and EEPROM areas of data addresses**

Data addresses are categorized as follows:

Data address Hexadecimal notation	Name	Remarks
1000 to 3FFF	RAM access data address	Reading and writing of these addresses are both performed on RAM. Since writing is not performed to EEPROM, the value returns to that stored in EEPROM after restarted.
9000 to BFFF	EEPROM access data address	Writing is performed to both RAM and EEPROM; reading is performed only on RAM. Since writing is also performed to EEPROM, the value does not change even after restarted.

Handling Precautions

・EEPROM's erase/write cycles are limited to about . Accordingly, it is recommended that very frequently written parameters be written to RAM, which does not have a limitation on cycles.
Note, with regard to writing to RAM, that data in EEPROM is transferred to RAM when the power is turned ON again.

● **Write data range**

If the write value exceeds the range determined by parameters, writing is not performed and an abnormal termination code is returned.

● **Write conditions**

An abnormal termination code is also returned when the writing is not possible due to the conditions.

9 - 5 Numeric Representation in the Application Layer

The specifications for numeric representation are hexadecimal fixed-length. Details are as follows:

Item	Specifications	Remedy
Extra space	Cannot be appended.	The message processing is aborted and an abnormal termination code is returned as a response message.
Extra zero	Cannot be appended.	
Numerical value = zero	Cannot be omitted. Be sure to use "0000".	
Other extra characters	Cannot be appended.	
Range of available numerical values	0000H to FFFFH	

9 - 6 List of Termination Codes

When an error occurred in the application layer, an abnormal termination code is returned as a response message.

Termination code	Description	Remedies
00	Normal termination	All processing has been completed normally.
10	Numeric value conversion error ・A character other than '0' to '9' and 'A' to 'F' exists in the application layer outside of the command. ・The length of the message in the application layer is illegal. ・A character other than '00' exists in the sub-command of the RU/WU command.	Only the termination code is returned, but the message processing is not performed.
21	Data address not existing in the read-out command is included.	Read-out value at relevant data address is returned as "0."
	Data address not existing in the write command is included.	Processing is continued excluding relevant address.
22	Data address other than read-out value of 8000 to 7FFF (-32768 to +32767 in the decimal notation) is included in the read-out command.	Read-out value of relevant data address is returned as "8000" (-32768 in the decimal notation) or "7FFF" (+32767 in the decimal notation).
	Data address beyond the setting range is included in the write value of the write command.	Processing is continued excluding relevant address.
23	Data address is included, which cannot be read out due to instrument conditions or communication lock.	Read-out value at relevant data address is returned as "0".
	Data address is included, which cannot be written due to instrument conditions or communication lock.	Processing is continued excluding relevant address.
40	Number of read-out/write data is illegal.	Only the termination code is returned
99	Command is not defined.	Only the termination code is returned

9 - 7 Reception and Transmission Timing

■ Timing specifications for instruction and response message

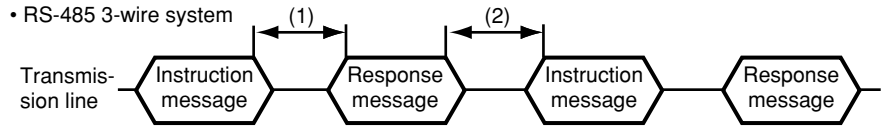
The cautions below are required with regard to the timing to transmit a instruction message from the master station and a response message from the slave station.

● Response monitor time

The maximum response time from the end of the instruction message transmission by the master station until when the master station receives a response message from the slave station is two seconds ((1) in the figure below). So, the response monitor time should be set to two seconds.
Generally, when a response time-out occurs, the instruction message is resent.

● Transmission start time

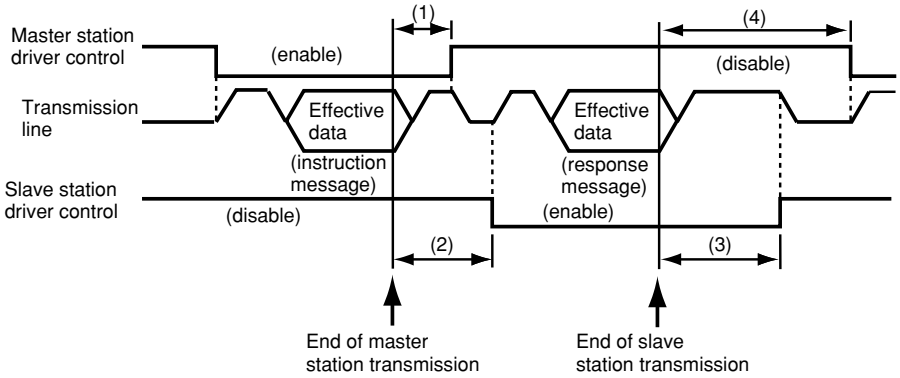
A wait time of 10 ms is required before the master station starts to transmit the next instruction message (to the same slave station or a different slave station) after the end of receiving response message ((2) in the figure below).



(1) End of master station transmission -
Transmission start time of slave station = Max. 2000 ms
(2) End of slave station transmission -
Transmission start time of master station = Min. 10 ms

■ RS-485 driver control timing specifications

When the transmission/reception on the RS-485 3-wire system is directly controlled by the master station, care should be paid to the following timing:



(1) End of master station transmission - Driver disable time = Max. 500 μs
(2) End of slave station reception - Driver enable time = Response time-out RS-485 communication bank (item display: Co5.01) or more
(3) End of slave station transmission - Driver disable time = Max. 10 ms
(4) End of master station reception - Driver enable time = Min. 10 ms

Chapter 10. LIST OF COMMUNICATION DATA

The following shows the meanings of the symbols stated in the "RAM/EEPROM Read/Write" columns:

No symbol : Possible.
□ : Possible according to the conditions.
△ : Possible, but data is invalid.
× : Impossible.

Handling Precautions

- When reading the EEPROM address, data in the RAM is read in the same manner as reading of the RAM address.

Decimal point information

-:	No decimal point
1 to 3:	Decimal point position (original value of data is multiplied by 10, 100, or 1000)
LP1 and 2:	Determined by the settings for the loop 1 or loop 2 in the control bank ("loop PV/SV decimal point position").
PV1 and 2:	Determined by the settings for PV1 or PV2 in the PV bank ("decimal point position").
RMP1 and 2:	Determined by the settings for loop 1 or loop 2 in the SP configuration bank ("SP ramp unit").
PID1 and 2:	Determined by the settings for loop 1 or loop 2 in the control bank ("integral time/derivative time decimal point position").
OUT1 to 7:	Determined by the settings for outputs 1 through 7 in the output bank ("output decimal point position").
EV1 to 7:	Determined by the settings for event Nos. 1 through 16 in the event configuration bank ("decimal point position").
Linearizations 1 to 8:	Determined by the settings for Linearizations 1 through 8 in the Linearization table bank ("breakpoint decimal point position").
MS1 to 3:	Determined by the settings for priorities 1 through 3 in the display/key bank ("MS display decimal point position").

RD/WD/RU/WU commands of CPL communication:

Use hexadecimal data addresses.

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
SP group	Loop 1	SP group selection	1000	9000					–	
selection	Loop 2	SP group selection	1004	9004					–	
Loop 1	SP1	LSP	1010	9010					LP1	
Multi-SP		PID group definition	1011	9011					–	
	SP2	LSP	1012	9012					LP1	
		PID group definition	1013	9013					–	
	SP3	LSP	1014	9014					LP1	
		PID group definition	1015	9015					–	
	SP4	LSP	1016	9016					LP1	
		PID group definition	1017	9017					–	
	SP5	LSP	1018	9018					LP1	
		PID group definition	1019	9019					–	
	SP6	LSP	101A	901A					LP1	
		PID group definition	101B	901B					–	
	SP7	LSP	101C	901C					LP1	
		PID group definition	101D	901D					–	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 1 Multi-SP	SP8	LSP	101E	901E					LP1	
		PID group definition	101F	901F					–	
	SP9	LSP	1020	9020					LP1	
		PID group definition	1021	9021					–	
	SP10	LSP	1022	9022					LP1	
		PID group definition	1023	9023					–	
	SP11	LSP	1024	9024					LP1	
		PID group definition	1025	9025					–	
	SP12	LSP	1026	9026					LP1	
		PID group definition	1027	9027					–	
	SP13	LSP	1028	9028					LP1	
		PID group definition	1029	9029					–	
	SP14	LSP	102A	902A					LP1	
		PID group definition	102B	902B					–	
	SP15	LSP	102C	902C					LP1	
		PID group definition	102D	902D					–	
	SP16	LSP	102E	902E					LP1	
		PID group definition	102F	902F					–	
Loop 2 Multi-SP	SP1	LSP	1030	9030					LP2	
		PID group definition	1031	9031					–	
	SP2	LSP	1032	9032					LP2	
		PID group definition	1033	9033					–	
	SP3	LSP	1034	9034					LP2	
		PID group definition	1035	9035					–	
	SP4	LSP	1036	9036					LP2	
		PID group definition	1037	9037					–	
	SP5	LSP	1038	9038					LP2	
		PID group definition	1039	9039					–	
	SP6	LSP	103A	903A					LP2	
		PID group definition	103B	903B					–	
	SP7	LSP	103C	903C					LP2	
		PID group definition	103D	903D					–	
	SP8	LSP	103E	903E					LP2	
		PID group definition	103F	903F					–	
	SP9	LSP	1040	9040					LP2	
		PID group definition	1041	9041					–	
	SP10	LSP	1042	9042					LP2	
		PID group definition	1043	9043					–	
	SP11	LSP	1044	9044					LP2	
		PID group definition	1045	9045					–	
	SP12	LSP	1046	9046					LP2	
		PID group definition	1047	9047					–	
	SP13	LSP	1048	9048					LP2	
		PID group definition	1049	9049					–	
	SP14	LSP	104A	904A					LP2	
		PID group definition	104B	904B					–	
	SP15	LSP	104C	904C					LP2	
		PID group definition	104D	904D					–	
	SP16	LSP	104E	904E					LP2	
		PID group definition	104F	904F					–	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
RSP	Loop 1	RSP	1090	9090		×		×	LP1	
		PID group definition	1091	9091					–	
	Loop 2	RSP	1094	9094		×		×	LP2	
		PID group definition	1095	9095					–	
SP configuration	Loop 1	SP low limit	10A0	90A0					LP1	
		SP high limit	10A1	90A1					LP1	
	Loop 2	SP low limit	10A4	90A4					LP2	
		SP high limit	10A5	90A5					LP2	
	Loop 1	SP ramp unit	10B0	90B0					–	
		SP ramp-up for LSP	10B1	90B1					RMP1	
		SP ramp-down for LSP	10B2	90B2					RMP1	
		RSP tracking	10B3	90B3					–	
	Loop 2	SP ramp unit	10C0	90C0					–	
		SP ramp-up for LSP	10C1	90C1					RMP2	
		SP ramp-down for LSP	10C2	90C2					RMP2	
		RSP tracking	10C3	90C3					–	
Event setup	EV1	Event main setting	10F0	90F0					EV1	
		Event sub-setting	10F1	90F1					EV1	
	EV2	Event main setting	10F2	90F2					EV2	
		Event sub-setting	10F3	90F3					EV2	
	EV3	Event main setting	10F4	90F4					EV3	
		Event sub-setting	10F5	90F5					EV3	
	EV4	Event main setting	10F6	90F6					EV4	
		Event sub-setting	10F7	90F7					EV4	
	EV5	Event main setting	10F8	90F8					EV5	
		Event sub-setting	10F9	90F9					EV5	
	EV6	Event main setting	10FA	90FA					EV6	
		Event sub-setting	10FB	90FB					EV6	
	EV7	Event main setting	10FC	90FC					EV7	
		Event sub-setting	10FD	90FD					EV7	
	EV8	Event main setting	10FE	90FE					EV8	
		Event sub-setting	10FF	90FF					EV8	
	EV9	Event main setting	1100	9100					EV9	
		Event sub-setting	1101	9101					EV9	
	EV10	Event main setting	1102	9102					EV10	
		Event sub-setting	1103	9103					EV10	
	EV11	Event main setting	1104	9104					EV11	
		Event sub-setting	1105	9105					EV11	
	EV12	Event main setting	1106	9106					EV12	
		Event sub-setting	1107	9107					EV12	
	EV13	Event main setting	1108	9108					EV13	
		Event sub-setting	1109	9109					EV13	
	EV14	Event main setting	110A	910A					EV14	
		Event sub-setting	110B	910B					EV14	
	EV15	Event main setting	110C	910C					EV15	
		Event sub-setting	110D	910D					EV15	
	EV16	Event main setting	110E	910E					EV16	
		Event sub-setting	110F	910F					EV16	
Event configuration	EV1	Operation type	1130	9130					–	
		Loop/channel definition	1131	9131					–	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Event configuration	EV1	Direct/reverse	1132	9132					–	
		Standby	1133	9133					–	
		EVENT state at READY	1134	9134					–	
		Decimal point position	1135	9135					–	
		Hysteresis	1136	9136					EV1	
		ON delay	1137	9137					1	
		OFF delay	1138	9138					1	
	EV2	Operation type	1140	9140					–	
		Loop/channel definition	1141	9141					–	
		Direct/reverse	1142	9142					–	
		Standby	1143	9143					–	
		EVENT state at READY	1144	9144					–	
		Decimal point position	1145	9145					–	
		Hysteresis	1146	9146					EV2	
		ON delay	1147	9147					1	
		OFF delay	1148	9148					1	
	EV3	Operation type	1150	9150					–	
		Loop/channel definition	1151	9151					–	
		Direct/reverse	1152	9152					–	
		Standby	1153	9153					–	
		EVENT state at READY	1154	9154					–	
		Decimal point position	1155	9155					–	
		Hysteresis	1156	9156					EV3	
		ON delay	1157	9157					1	
		OFF delay	1158	9158					1	
	EV4	Operation type	1160	9160					–	
		Loop/channel definition	1161	9161					–	
		Direct/reverse	1162	9162					–	
		Standby	1163	9163					–	
		EVENT state at READY	1164	9164					–	
		Decimal point position	1165	9165					–	
		Hysteresis	1166	9166					EV4	
		ON delay	1167	9167					1	
		OFF delay	1168	9168					1	
	EV5	Operation type	1170	9170					–	
		Loop/channel definition	1171	9171					–	
		Direct/reverse	1172	9172					–	
		Standby	1173	9173					–	
		EVENT state at READY	1174	9174					–	
		Decimal point position	1175	9175					–	
		Hysteresis	1176	9176					EV5	
		ON delay	1177	9177					1	
		OFF delay	1178	9178					1	
	EV6	Operation type	1180	9180					–	
		Loop/channel definition	1181	9181					–	
		Direct/reverse	1182	9182					–	
		Standby	1183	9183					–	
		EVENT state at READY	1184	9184					–	
		Decimal point position	1185	9185					–	
		Hysteresis	1186	9186					EV6	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Event configuration	EV6	ON delay	1187	9187					1	
		OFF delay	1188	9188					1	
	EV7	Operation type	1190	9190					–	
		Loop/channel definition	1191	9191					–	
		Direct/reverse	1192	9192					–	
		Standby	1193	9193					–	
		EVENT state at READY	1194	9194					–	
		Decimal point position	1195	9195					–	
		Hysteresis	1196	9196					EV7	
		ON delay	1197	9197					1	
		OFF delay	1198	9198					1	
	EV8	Operation type	11A0	91A0					–	
		Loop/channel definition	11A1	91A1					–	
		Direct/reverse	11A2	91A2					–	
		Standby	11A3	91A3					–	
		EVENT state at READY	11A4	91A4					–	
		Decimal point position	11A5	91A5					–	
		Hysteresis	11A6	91A6					EV8	
		ON delay	11A7	91A7					1	
		OFF delay	11A8	91A8					1	
	EV9	Operation type	11B0	91B0					–	
		Loop/channel definition	11B1	91B1					–	
		Direct/reverse	11B2	91B2					–	
		Standby	11B3	91B3					–	
		EVENT state at READY	11B4	91B4					–	
		Decimal point position	11B5	91B5					–	
		Hysteresis	11B6	91B6					EV9	
		ON delay	11B7	91B7					1	
		OFF delay	11B8	91B8					1	
	EV10	Operation type	11C0	91C0					–	
		Loop/channel definition	11C1	91C1					–	
		Direct/reverse	11C2	91C2					–	
		Standby	11C3	91C3					–	
		EVENT state at READY	11C4	91C4					–	
		Decimal point position	11C5	91C5					–	
		Hysteresis	11C6	91C6					EV10	
		ON delay	11C7	91C7					1	
		OFF delay	11C8	91C8					1	
	EV11	Operation type	11D0	91D0					–	
		Loop/channel definition	11D1	91D1					–	
		Direct/reverse	11D2	91D2					–	
		Standby	11D3	91D3					–	
		EVENT state at READY	11D4	91D4					–	
		Decimal point position	11D5	91D5					–	
		Hysteresis	11D6	91D6					EV11	
		ON delay	11D7	91D7					1	
		OFF delay	11D8	91D8					1	
	EV12	Operation type	11E0	91E0					–	
		Loop/channel definition	11E1	91E1					–	
		Direct/reverse	11E2	91E2					–	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Event configuration	EV12	Standby	11E3	91E3					–	
		EVENT state at READY	11E4	91E4					–	
		Decimal point position	11E5	91E5					–	
		Hysteresis	11E6	91E6					EV12	
		ON delay	11E7	91E7					1	
		OFF delay	11E8	91E8					1	
	EV13	Operation type	11F0	91F0					–	
		Loop/channel definition	11F1	91F1					–	
		Direct/reverse	11F2	91F2					–	
		Standby	11F3	91F3					–	
		EVENT state at READY	11F4	91F4					–	
		Decimal point position	11F5	91F5					–	
		Hysteresis	11F6	91F6					EV13	
		ON delay	11F7	91F7					1	
		OFF delay	11F8	91F8					1	
	EV14	Operation type	1200	9200					–	
		Loop/channel definition	1201	9201					–	
		Direct/reverse	1202	9202					–	
		Standby	1203	9203					–	
		EVENT state at READY	1204	9204					–	
		Decimal point position	1205	9205					–	
		Hysteresis	1206	9206					EV14	
		ON delay	1207	9207					1	
		OFF delay	1208	9208					1	
	EV15	Operation type	1210	9210					–	
		Loop/channel definition	1211	9211					–	
		Direct/reverse	1212	9212					–	
		Standby	1213	9213					–	
		EVENT state at READY	1214	9214					–	
		Decimal point position	1215	9215					–	
		Hysteresis	1216	9216					EV15	
		ON delay	1217	9217					1	
		OFF delay	1218	9218					1	
	EV16	Operation type	1220	9220					–	
		Loop/channel definition	1221	9221					–	
		Direct/reverse	1222	9222					–	
		Standby	1223	9223					–	
		EVENT state at READY	1224	9224					–	
		Decimal point position	1225	9225					–	
		Hysteresis	1226	9226					EV16	
		ON delay	1227	9227					1	
		OFF delay	1228	9228					1	
Loop 1 recipe	SP1	LSP	1330	9330					LP1	
		Event 1 main setting	1331	9331					EV1	
		Event 1 sub-setting	1332	9332					EV1	
		Event 2 main setting	1333	9333					EV2	
		Event 2 sub-setting	1334	9334					EV2	
		Event 3 main setting	1335	9335					EV3	
		Event 3 sub-setting	1336	9336					EV3	
		Event 4 main setting	1337	9337					EV4	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 1 recipe	SP1	Event 4 sub-setting	1338	9338					EV4	
		Event 5 main setting	1339	9339					EV5	
		Event 5 sub-setting	133A	933A					EV5	
		Event 6 main setting	133B	933B					EV6	
		Event 6 sub-setting	133C	933C					EV6	
		Event 7 main setting	133D	933D					EV7	
		Event 7 sub-setting	133E	933E					EV7	
		Event 8 main setting	133F	933F					EV8	
		Event 8 sub-setting	1340	9340					EV8	
		Proportional band	1341	9341					1	
		Integral time	1342	9342					PID1	
		Derivative time	1343	9343					PID1	
		Output low limit	1344	9344					1	
		Output high limit	1345	9345					1	
		Manual reset	1346	9346					1	
		Proportional band for cool side	1347	9347					1	
		Integration time for cool side	1348	9348					PID1	
		Derivative time for cool side	1349	9349					PID1	
		Output low limit for cool side	134A	934A					1	
		Output high limit for cool side	134B	934B					1	
		Initial output of PID control	134C	934C					1	
	SP2	LSP	1350	9350					LP1	
		Event 1 main setting	1351	9351					EV1	
		Event 1 sub-setting	1352	9352					EV1	
		Event 2 main setting	1353	9353					EV2	
		Event 2 sub-setting	1354	9354					EV2	
		Event 3 main setting	1355	9355					EV3	
		Event 3 sub-setting	1356	9356					EV3	
		Event 4 main setting	1357	9357					EV4	
		Event 4 sub-setting	1358	9358					EV4	
		Event 5 main setting	1359	9359					EV5	
		Event 5 sub-setting	135A	935A					EV5	
		Event 6 main setting	135B	935B					EV6	
		Event 6 sub-setting	135C	935C					EV6	
		Event 7 main setting	135D	935D					EV7	
		Event 7 sub-setting	135E	935E					EV7	
		Event 8 main setting	135F	935F					EV8	
		Event 8 sub-setting	1360	9360					EV8	
		Proportional band	1361	9361					1	
		Integral time	1362	9362					PID1	
		Derivative time	1363	9363					PID1	
		Output low limit	1364	9364					1	
		Output high limit	1365	9365					1	
		Manual reset	1366	9366					1	
		Proportional band for cool side	1367	9367					1	
		Integration time for cool side	1368	9368					PID1	
		Derivative time for cool side	1369	9369					PID1	
		Output low limit for cool side	136A	936A					1	
		Output high limit for cool side	136B	936B					1	
		Initial output of PID control	136C	936C					1	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 1 recipe	SP3	LSP	1370	9370					LP1	
		Event 1 main setting	1371	9371					EV1	
		Event 1 sub-setting	1372	9372					EV1	
		Event 2 main setting	1373	9373					EV2	
		Event 2 sub-setting	1374	9374					EV2	
		Event 3 main setting	1375	9375					EV3	
		Event 3 sub-setting	1376	9376					EV3	
		Event 4 main setting	1377	9377					EV4	
		Event 4 sub-setting	1378	9378					EV4	
		Event 5 main setting	1379	9379					EV5	
		Event 5 sub-setting	137A	937A					EV5	
		Event 6 main setting	137B	937B					EV6	
		Event 6 sub-setting	137C	937C					EV6	
		Event 7 main setting	137D	937D					EV7	
		Event 7 sub-setting	137E	937E					EV7	
		Event 8 main setting	137F	937F					EV8	
		Event 8 sub-setting	1380	9380					EV8	
		Proportional band	1381	9381					1	
		Integral time	1382	9382					PID1	
		Derivative time	1383	9383					PID1	
		Output low limit	1384	9384					1	
		Output high limit	1385	9385					1	
		Manual reset	1386	9386					1	
		Proportional band for cool side	1387	9387					1	
		Integration time for cool side	1388	9388					PID1	
		Derivative time for cool side	1389	9389					PID1	
		Output low limit for cool side	138A	938A					1	
		Output high limit for cool side	138B	938B					1	
		Initial output of PID control	138C	938C					1	
	SP4	LSP	1390	9390					LP1	
		Event 1 main setting	1391	9391					EV1	
		Event 1 sub-setting	1392	9392					EV1	
		Event 2 main setting	1393	9393					EV2	
		Event 2 sub-setting	1394	9394					EV2	
		Event 3 main setting	1395	9395					EV3	
		Event 3 sub-setting	1396	9396					EV3	
		Event 4 main setting	1397	9397					EV4	
		Event 4 sub-setting	1398	9398					EV4	
		Event 5 main setting	1399	9399					EV5	
		Event 5 sub-setting	139A	939A					EV5	
		Event 6 main setting	139B	939B					EV6	
		Event 6 sub-setting	139C	939C					EV6	
		Event 7 main setting	139D	939D					EV7	
		Event 7 sub-setting	139E	939E					EV7	
		Event 8 main setting	139F	939F					EV8	
		Event 8 sub-setting	13A0	93A0					EV8	
		Proportional band	13A1	93A1					1	
		Integral time	13A2	93A2					PID1	
		Derivative time	13A3	93A3					PID1	
		Output low limit	13A4	93A4					1	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 1 recipe	SP4	Output high limit	13A5	93A5					1	
		Manual reset	13A6	93A6					1	
		Proportional band for cool side	13A7	93A7					1	
		Integration time for cool side	13A8	93A8					PID1	
		Derivative time for cool side	13A9	93A9					PID1	
		Output low limit for cool side	13AA	93AA					1	
		Output high limit for cool side	13AB	93AB					1	
		Initial output of PID control	13AC	93AC					1	
	SP5	LSP	13B0	93B0					LP1	
		Event 1 main setting	13B1	93B1					EV1	
		Event 1 sub-setting	13B2	93B2					EV1	
		Event 2 main setting	13B3	93B3					EV2	
		Event 2 sub-setting	13B4	93B4					EV2	
		Event 3 main setting	13B5	93B5					EV3	
		Event 3 sub-setting	13B6	93B6					EV3	
		Event 4 main setting	13B7	93B7					EV4	
		Event 4 sub-setting	13B8	93B8					EV4	
		Event 5 main setting	13B9	93B9					EV5	
		Event 5 sub-setting	13BA	93BA					EV5	
		Event 6 main setting	13BB	93BB					EV6	
		Event 6 sub-setting	13BC	93BC					EV6	
		Event 7 main setting	13BD	93BD					EV7	
		Event 7 sub-setting	13BE	93BE					EV7	
		Event 8 main setting	13BF	93BF					EV8	
		Event 8 sub-setting	13C0	93C0					EV8	
		Proportional band	13C1	93C1					1	
		Integral time	13C2	93C2					PID1	
		Derivative time	13C3	93C3					PID1	
		Output low limit	13C4	93C4					1	
		Output high limit	13C5	93C5					1	
		Manual reset	13C6	93C6					1	
		Proportional band for cool side	13C7	93C7					1	
		Integration time for cool side	13C8	93C8					PID1	
		Derivative time for cool side	13C9	93C9					PID1	
		Output low limit for cool side	13CA	93CA					1	
		Output high limit for cool side	13CB	93CB					1	
		Initial output of PID control	13CC	93CC					1	
	SP6	LSP	13D0	93D0					LP1	
		Event 1 main setting	13D1	93D1					EV1	
		Event 1 sub-setting	13D2	93D2					EV1	
		Event 2 main setting	13D3	93D3					EV2	
		Event 2 sub-setting	13D4	93D4					EV2	
		Event 3 main setting	13D5	93D5					EV3	
		Event 3 sub-setting	13D6	93D6					EV3	
		Event 4 main setting	13D7	93D7					EV4	
		Event 4 sub-setting	13D8	93D8					EV4	
		Event 5 main setting	13D9	93D9					EV5	
		Event 5 sub-setting	13DA	93DA					EV5	
		Event 6 main setting	13DB	93DB					EV6	
		Event 6 sub-setting	13DC	93DC					EV6	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 1 recipe	SP6	Event 7 main setting	13DD	93DD					EV7	
		Event 7 sub-setting	13DE	93DE					EV7	
		Event 8 main setting	13DF	93DF					EV8	
		Event 8 sub-setting	13E0	93E0					EV8	
		Proportional band	13E1	93E1					1	
		Integral time	13E2	93E2					PID1	
		Derivative time	13E3	93E3					PID1	
		Output low limit	13E4	93E4					1	
		Output high limit	13E5	93E5					1	
		Manual reset	13E6	93E6					1	
		Proportional band for cool side	13E7	93E7					1	
		Integration time for cool side	13E8	93E8					PID1	
		Derivative time for cool side	13E9	93E9					PID1	
		Output low limit for cool side	13EA	93EA					1	
		Output high limit for cool side	13EB	93EB					1	
		Initial output of PID contro	13EC	93EC					1	
	SP7	LSP	13F0	93F0					LP1	
		Event 1 main setting	13F1	93F1					EV1	
		Event 1 sub-setting	13F2	93F2					EV1	
		Event 2 main setting	13F3	93F3					EV2	
		Event 2 sub-setting	13F4	93F4					EV2	
		Event 3 main setting	13F5	93F5					EV3	
		Event 3 sub-setting	13F6	93F6					EV3	
		Event 4 main setting	13F7	93F7					EV4	
		Event 4 sub-setting	13F8	93F8					EV4	
		Event 5 main setting	13F9	93F9					EV5	
		Event 5 sub-setting	13FA	93FA					EV5	
		Event 6 main setting	13FB	93FB					EV6	
		Event 6 sub-setting	13FC	93FC					EV6	
		Event 7 main setting	13FD	93FD					EV7	
		Event 7 sub-setting	13FE	93FE					EV7	
		Event 8 main setting	13FF	93FF					EV8	
		Event 8 sub-setting	1400	9400					EV8	
		Proportional band	1401	9401					1	
		Integral time	1402	9402					PID1	
		Derivative time	1403	9403					PID1	
		Output low limit	1404	9404					1	
		Output high limit	1405	9405					1	
		Manual reset	1406	9406					1	
		Proportional band for cool side	1407	9407					1	
		Integration time for cool side	1408	9408					PID1	
		Derivative time for cool side	1409	9409					PID1	
		Output low limit for cool side	140A	940A					1	
		Output high limit for cool side	140B	940B					1	
		nitial output of PID control	140C	940C					1	
	SP8	LSP	1410	9410					LP1	
		Event 1 main setting	1411	9411					EV1	
		Event 1 sub-setting	1412	9412					EV1	
		Event 2 main setting	1413	9413					EV2	
		Event 2 sub-setting	1414	9414					EV2	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 1 recipe	SP8	Event 3 main setting	1415	9415					EV3	
		Event 3 sub-setting	1416	9416					EV3	
		Event 4 main setting	1417	9417					EV4	
		Event 4 sub-setting	1418	9418					EV4	
		Event 5 main setting	1419	9419					EV5	
		Event 5 sub-setting	141A	941A					EV5	
		Event 6 main setting	141B	941B					EV6	
		Event 6 sub-setting	141C	941C					EV6	
		Event 7 main setting	141D	941D					EV7	
		Event 7 sub-setting	141E	941E					EV7	
		Event 8 main setting	141F	941F					EV8	
		Event 8 sub-setting	1420	9420					EV8	
		Proportional band	1421	9421					1	
		Integral time	1422	9422					PID1	
		Derivative time	1423	9423					PID1	
		Output low limit	1424	9424					1	
		Output high limit	1425	9425					1	
		Manual reset	1426	9426					1	
		Proportional band for cool side	1427	9427					1	
		Integration time for cool side	1428	9428					PID1	
		Derivative time for cool side	1429	9429					PID1	
		Output low limit for cool side	142A	942A					1	
		Output high limit for cool side	142B	942B					1	
		Initial output of PID control	142C	942C					1	
	SP9	LSP	1430	9430					LP1	
		Event 1 main setting	1431	9431					EV1	
		Event 1 sub-setting	1432	9432					EV1	
		Event 2 main setting	1433	9433					EV2	
		Event 2 sub-setting	1434	9434					EV2	
		Event 3 main setting	1435	9435					EV3	
		Event 3 sub-setting	1436	9436					EV3	
		Event 4 main setting	1437	9437					EV4	
		Event 4 sub-setting	1438	9438					EV4	
		Event 5 main setting	1439	9439					EV5	
		Event 5 sub-setting	143A	943A					EV5	
		Event 6 main setting	143B	943B					EV6	
		Event 6 sub-setting	143C	943C					EV6	
		Event 7 main setting	143D	943D					EV7	
		Event 7 sub-setting	143E	943E					EV7	
		Event 8 main setting	143F	943F					EV8	
		Event 8 sub-setting	1440	9440					EV8	
		Proportional band	1441	9441					1	
		Integral time	1442	9442					PID1	
		Derivative time	1443	9443					PID1	
		Output low limit	1444	9444					1	
		Output high limit	1445	9445					1	
		Manual reset	1446	9446					1	
		Proportional band for cool side	1447	9447					1	
		Integration time for cool side	1448	9448					PID1	
		Derivative time for cool side	1449	9449					PID1	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 1 recipe	SP9	Output low limit for cool side	144A	944A					1	
		Output high limit for cool side	144B	944B					1	
		Initial output of PID control	144C	944C					1	
	SP10	LSP	1450	9450					LP1	
		Event 1 main setting	1451	9451					EV1	
		Event 1 sub-setting	1452	9452					EV1	
		Event 2 main setting	1453	9453					EV2	
		Event 2 sub-setting	1454	9454					EV2	
		Event 3 main setting	1455	9455					EV3	
		Event 3 sub-setting	1456	9456					EV3	
		Event 4 main setting	1457	9457					EV4	
		Event 4 sub-setting	1458	9458					EV4	
		Event 5 main setting	1459	9459					EV5	
		Event 5 sub-setting	145A	945A					EV5	
		Event 6 main setting	145B	945B					EV6	
		Event 6 sub-setting	145C	945C					EV6	
		Event 7 main setting	145D	945D					EV7	
		Event 7 sub-setting	145E	945E					EV7	
		Event 8 main setting	145F	945F					EV8	
		Event 8 sub-setting	1460	9460					EV8	
		Proportional band	1461	9461					1	
		Integral time	1462	9462					PID1	
		Derivative time	1463	9463					PID1	
		Output low limit	1464	9464					1	
		Output high limit	1465	9465					1	
		Manual reset	1466	9466					1	
		Proportional band for cool side	1467	9467					1	
		Integration time for cool side	1468	9468					PID1	
		Derivative time for cool side	1469	9469					PID1	
		Output low limit for cool side	146A	946A					1	
		Output high limit for cool side	146B	946B					1	
		Initial output of PID control	146C	946C					1	
	SP11	LSP	1470	9470					LP1	
		Event 1 main setting	1471	9471					EV1	
		Event 1 sub-setting	1472	9472					EV1	
		Event 2 main setting	1473	9473					EV2	
		Event 2 sub-setting	1474	9474					EV2	
		Event 3 main setting	1475	9475					EV3	
		Event 3 sub-setting	1476	9476					EV3	
		Event 4 main setting	1477	9477					EV4	
		Event 4 sub-setting	1478	9478					EV4	
		Event 5 main setting	1479	9479					EV5	
		Event 5 sub-setting	147A	947A					EV5	
		Event 6 main setting	147B	947B					EV6	
		Event 6 sub-setting	147C	947C					EV6	
		Event 7 main setting	147D	947D					EV7	
		Event 7 sub-setting	147E	947E					EV7	
		Event 8 main setting	147F	947F					EV8	
		Event 8 sub-setting	1480	9480					EV8	
		Proportional band	1481	9481					1	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 1 recipe	SP11	Integral time	1482	9482					PID1	
		Derivative time	1483	9483					PID1	
		Output low limit	1484	9484					1	
		Output high limit	1485	9485					1	
		Manual reset	1486	9486					1	
		Proportional band for cool side	1487	9487					1	
		Integration time for cool side	1488	9488					PID1	
		Derivative time for cool side	1489	9489					PID1	
		Output low limit for cool side	148A	948A					1	
		Output high limit for cool side	148B	948B					1	
		Initial output of PID control	148C	948C					1	
	SP12	LSP	1490	9490					LP1	
		Event 1 main setting	1491	9491					EV1	
		Event 1 sub-setting	1492	9492					EV1	
		Event 2 main setting	1493	9493					EV2	
		Event 2 sub-setting	1494	9494					EV2	
		Event 3 main setting	1495	9495					EV3	
		Event 3 sub-setting	1496	9496					EV3	
		Event 4 main setting	1497	9497					EV4	
		Event 4 sub-setting	1498	9498					EV4	
		Event 5 main setting	1499	9499					EV5	
		Event 5 sub-setting	149A	949A					EV5	
		Event 6 main setting	149B	949B					EV6	
		Event 6 sub-setting	149C	949C					EV6	
		Event 7 main setting	149D	949D					EV7	
		Event 7 sub-setting	149E	949E					EV7	
		Event 8 main setting	149F	949F					EV8	
		Event 8 sub-setting	14A0	94A0					EV8	
		Proportional band	14A1	94A1					1	
		Integral time	14A2	94A2					PID1	
		Derivative time	14A3	94A3					PID1	
		Output low limit	14A4	94A4					1	
		Output high limit	14A5	94A5					1	
		Manual reset	14A6	94A6					1	
		Proportional band for cool side	14A7	94A7					1	
		Integration time for cool side	14A8	94A8					PID1	
		Derivative time for cool side	14A9	94A9					PID1	
		Output low limit for cool side	14AA	94AA					1	
		Output high limit for cool side	14AB	94AB					1	
		Initial output of PID control	14AC	94AC					1	
	SP13	LSP	14B0	94B0					LP1	
		Event 1 main setting	14B1	94B1					EV1	
		Event 1 sub-setting	14B2	94B2					EV1	
		Event 2 main setting	14B3	94B3					EV2	
		Event 2 sub-setting	14B4	94B4					EV2	
		Event 3 main setting	14B5	94B5					EV3	
		Event 3 sub-setting	14B6	94B6					EV3	
		Event 4 main setting	14B7	94B7					EV4	
		Event 4 sub-setting	14B8	94B8					EV4	
		Event 5 main setting	14B9	94B9					EV5	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 1 recipe	SP13	Event 5 sub-setting	14BA	94BA					EV5	
		Event 6 main setting	14BB	94BB					EV6	
		Event 6 sub-setting	14BC	94BC					EV6	
		Event 7 main setting	14BD	94BD					EV7	
		Event 7 sub-setting	14BE	94BE					EV7	
		Event 8 main setting	14BF	94BF					EV8	
		Event 8 sub-setting	14C0	94C0					EV8	
		Proportional band	14C1	94C1					1	
		Integral time	14C2	94C2					PID1	
		Derivative time	14C3	94C3					PID1	
		Output low limit	14C4	94C4					1	
		Output high limit	14C5	94C5					1	
		Manual reset	14C6	94C6					1	
		Proportional band for cool side	14C7	94C7					1	
		Integration time for cool side	14C8	94C8					PID1	
		Derivative time for cool side	14C9	94C9					PID1	
		Output low limit for cool side	14CA	94CA					1	
		Output high limit for cool side	14CB	94CB					1	
		Initial output of PID control	14CC	94CC					1	
	SP14	LSP	14D0	94D0					LP1	
		Event 1 main setting	14D1	94D1					EV1	
		Event 1 sub-setting	14D2	94D2					EV1	
		Event 2 main setting	14D3	94D3					EV2	
		Event 2 sub-setting	14D4	94D4					EV2	
		Event 3 main setting	14D5	94D5					EV3	
		Event 3 sub-setting	14D6	94D6					EV3	
		Event 4 main setting	14D7	94D7					EV4	
		Event 4 sub-setting	14D8	94D8					EV4	
		Event 5 main setting	14D9	94D9					EV5	
		Event 5 sub-setting	14DA	94DA					EV5	
		Event 6 main setting	14DB	94DB					EV6	
		Event 6 sub-setting	14DC	94DC					EV6	
		Event 7 main setting	14DD	94DD					EV7	
		Event 7 sub-setting	14DE	94DE					EV7	
		Event 8 main setting	14DF	94DF					EV8	
		Event 8 sub-setting	14E0	94E0					EV8	
		Proportional band	14E1	94E1					1	
		Integral time	14E2	94E2					PID1	
		Derivative time	14E3	94E3					PID1	
		Output low limit	14E4	94E4					1	
		Output high limit	14E5	94E5					1	
		Manual reset	14E6	94E6					1	
		Proportional band for cool side	14E7	94E7					1	
		Integration time for cool side	14E8	94E8					PID1	
		Derivative time for cool side	14E9	94E9					PID1	
		Output low limit for cool side	14EA	94EA					1	
		Output high limit for cool side	14EB	94EB					1	
		Initial output of PID control	14EC	94EC					1	
	SP15	LSP	14F0	94F0					LP1	
		Event 1 main setting	14F1	94F1					EV1	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 1 recipe	SP15	Event 1 sub-setting	14F2	94F2					EV1	
		Event 2 main setting	14F3	94F3					EV2	
		Event 2 sub-setting	14F4	94F4					EV2	
		Event 3 main setting	14F5	94F5					EV3	
		Event 3 sub-setting	14F6	94F6					EV3	
		Event 4 main setting	14F7	94F7					EV4	
		Event 4 sub-setting	14F8	94F8					EV4	
		Event 5 main setting	14F9	94F9					EV5	
		Event 5 sub-setting	14FA	94FA					EV5	
		Event 6 main setting	14FB	94FB					EV6	
		Event 6 sub-setting	14FC	94FC					EV6	
		Event 7 main setting	14FD	94FD					EV7	
		Event 7 sub-setting	14FE	94FE					EV7	
		Event 8 main setting	14FF	94FF					EV8	
		Event 8 sub-setting	1500	9500					EV8	
		Proportional band	1501	9501					1	
		Integral time	1502	9502					PID1	
		Derivative time	1503	9503					PID1	
		Output low limit	1504	9504					1	
		Output high limit	1505	9505					1	
		Manual reset	1506	9506					1	
		Proportional band for cool side	1507	9507					1	
		Integration time for cool side	1508	9508					PID1	
		Derivative time for cool side	1509	9509					PID1	
		Output low limit for cool side	150A	950A					1	
		Output high limit for cool side	150B	950B					1	
		Initial output of PID control	150C	950C					1	
	SP16	LSP	1510	9510					LP1	
		Event 1 main setting	1511	9511					EV1	
		Event 1 sub-setting	1512	9512					EV1	
		Event 2 main setting	1513	9513					EV2	
		Event 2 sub-setting	1514	9514					EV2	
		Event 3 main setting	1515	9515					EV3	
		Event 3 sub-setting	1516	9516					EV3	
		Event 4 main setting	1517	9517					EV4	
		Event 4 sub-setting	1518	9518					EV4	
		Event 5 main setting	1519	9519					EV5	
		Event 5 sub-setting	151A	951A					EV5	
		Event 6 main setting	151B	951B					EV6	
		Event 6 sub-setting	151C	951C					EV6	
		Event 7 main setting	151D	951D					EV7	
		Event 7 sub-setting	151E	951E					EV7	
		Event 8 main setting	151F	951F					EV8	
		Event 8 sub-setting	1520	9520					EV8	
		Proportional band	1521	9521					1	
		Integral time	1522	9522					PID1	
		Derivative time	1523	9523					PID1	
		Output low limit	1524	9524					1	
		Output high limit	1525	9525					1	
		Manual reset	1526	9526					1	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 1 recipe	SP16	Proportional band for cool side	1527	9527					1	
		Integration time for cool side	1528	9528					PID1	
		Derivative time for cool side	1529	9529					PID1	
		Output low limit for cool side	152A	952A					1	
		Output high limit for cool side	152B	952B					1	
		Initial output of PID control	152C	952C					1	
Loop 2 recipe	SP1	LSP	1530	9530					LP2	
		Event 9 main setting	1531	9531					EV9	
		Event 9 sub-setting	1532	9532					EV9	
		Event 10 main setting	1533	9533					EV10	
		Event 10 sub-setting	1534	9534					EV10	
		Event 11 main setting	1535	9535					EV11	
		Event 11 sub-setting	1536	9536					EV11	
		Event 12 main setting	1537	9537					EV12	
		Event 12 sub-setting	1538	9538					EV12	
		Event 13 main setting	1539	9539					EV13	
		Event 13 sub-setting	153A	953A					EV13	
		Event 14 main setting	153B	953B					EV14	
		Event 14 sub-setting	153C	953C					EV14	
		Event 15 main setting	153D	953D					EV15	
		Event 15 sub-setting	153E	953E					EV15	
		Event 16 main setting	153F	953F					EV16	
		Event 16 sub-setting	1540	9540					EV16	
		Proportional band	1541	9541					1	
		Integral time	1542	9542					PID2	
		Derivative time	1543	9543					PID2	
		Output low limit	1544	9544					1	
		Output high limit	1545	9545					1	
		Manual reset	1546	9546					1	
		Proportional band for cool side	1547	9547					1	
		Integration time for cool side	1548	9548					PID2	
		Derivative time for cool side	1549	9549					PID2	
		Output low limit for cool side	154A	954A					1	
		Output high limit for cool side	154B	954B					1	
		Initial output of PID control	154C	954C					1	
	SP2	LSP	1550	9550					LP2	
		Event 9 main setting	1551	9551					EV9	
		Event 9 sub-setting	1552	9552					EV9	
		Event 10 main setting	1553	9553					EV10	
		Event 10 sub-setting	1554	9554					EV10	
		Event 11 main setting	1555	9555					EV11	
		Event 11 sub-setting	1556	9556					EV11	
		Event 12 main setting	1557	9557					EV12	
		Event 12 sub-setting	1558	9558					EV12	
		Event 13 main setting	1559	9559					EV13	
		Event 13 sub-setting	155A	955A					EV13	
		Event 14 main setting	155B	955B					EV14	
		Event 14 sub-setting	155C	955C					EV14	
		Event 15 main setting	155D	955D					EV15	
		Event 15 sub-setting	155E	955E					EV15	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 2 recipe	SP2	Event 16 main setting	155F	955F					EV16	
		Event 16 sub-setting	1560	9560					EV16	
		Proportional band	1561	9561					1	
		Integral time	1562	9562					PID2	
		Derivative time	1563	9563					PID2	
		Output low limit	1564	9564					1	
		Output high limit	1565	9565					1	
		Manual reset	1566	9566					1	
		Proportional band for cool side	1567	9567					1	
		Integration time for cool side	1568	9568					PID2	
		Derivative time for cool side	1569	9569					PID2	
		Output low limit for cool side	156A	956A					1	
		Output high limit for cool side	156B	956B					1	
		Initial output of PID control	156C	956C					1	
	SP3	LSP	1570	9570					LP2	
		Event 9 main setting	1571	9571					EV9	
		Event 9 sub-setting	1572	9572					EV9	
		Event 10 main setting	1573	9573					EV10	
		Event 10 sub-setting	1574	9574					EV10	
		Event 11 main setting	1575	9575					EV11	
		Event 11 sub-setting	1576	9576					EV11	
		Event 12 main setting	1577	9577					EV12	
		Event 12 sub-setting	1578	9578					EV12	
		Event 13 main setting	1579	9579					EV13	
		Event 13 sub-setting	157A	957A					EV13	
		Event 14 main setting	157B	957B					EV14	
		Event 14 sub-setting	157C	957C					EV14	
		Event 15 main setting	157D	957D					EV15	
		Event 15 sub-setting	157E	957E					EV15	
		Event 16 main setting	157F	957F					EV16	
		Event 16 sub-setting	1580	9580					EV16	
		Proportional band	1581	9581					1	
		Integral time	1582	9582					PID2	
		Derivative time	1583	9583					PID2	
		Output low limit	1584	9584					1	
		Output high limit	1585	9585					1	
		Manual reset	1586	9586					1	
		Proportional band for cool side	1587	9587					1	
		Integration time for cool side	1588	9588					PID2	
		Derivative time for cool side	1589	9589					PID2	
		Output low limit for cool side	158A	958A					1	
		Output high limit for cool side	158B	958B					1	
		Initial output of PID control	158C	958C					1	
	SP4	LSP	1590	9590					LP2	
		Event 9 main setting	1591	9591					EV9	
		Event 9 sub-setting	1592	9592					EV9	
		Event 10 main setting	1593	9593					EV10	
		Event 10 sub-setting	1594	9594					EV10	
		Event 11 main setting	1595	9595					EV11	
		Event 11 sub-setting	1596	9596					EV11	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 2 recipe	SP4	Event 12 main setting	1597	9597					EV12	
		Event 12 sub-setting	1598	9598					EV12	
		Event 13 main setting	1599	9599					EV13	
		Event 13 sub-setting	159A	959A					EV13	
		Event 14 main setting	159B	959B					EV14	
		Event 14 sub-setting	159C	959C					EV14	
		Event 15 main setting	159D	959D					EV15	
		Event 15 sub-setting	159E	959E					EV15	
		Event 16 main setting	159F	959F					EV16	
		Event 16 sub-setting	15A0	95A0					EV16	
		Proportional band	15A1	95A1					1	
		Integral time	15A2	95A2					PID2	
		Derivative time	15A3	95A3					PID2	
		Output low limit	15A4	95A4					1	
		Output high limit	15A5	95A5					1	
		Manual reset	15A6	95A6					1	
		Proportional band for cool side	15A7	95A7					1	
		Integration time for cool side	15A8	95A8					PID2	
		Derivative time for cool side	15A9	95A9					PID2	
		Output low limit for cool side	15AA	95AA					1	
		Output high limit for cool side	15AB	95AB					1	
		Initial output of PID control	15AC	95AC					1	
	SP5	LSP	15B0	95B0					LP2	
		Event 9 main setting	15B1	95B1					EV9	
		Event 9 sub-setting	15B2	95B2					EV9	
		Event 10 main setting	15B3	95B3					EV10	
		Event 10 sub-setting	15B4	95B4					EV10	
		Event 11 main setting	15B5	95B5					EV11	
		Event 11 sub-setting	15B6	95B6					EV11	
		Event 12 main setting	15B7	95B7					EV12	
		Event 12 sub-setting	15B8	95B8					EV12	
		Event 13 main setting	15B9	95B9					EV13	
		Event 13 sub-setting	15BA	95BA					EV13	
		Event 14 main setting	15BB	95BB					EV14	
		Event 14 sub-setting	15BC	95BC					EV14	
		Event 15 main setting	15BD	95BD					EV15	
		Event 15 sub-setting	15BE	95BE					EV15	
		Event 16 main setting	15BF	95BF					EV16	
		Event 16 sub-setting	15C0	95C0					EV16	
		Proportional band	15C1	95C1					1	
		Integral time	15C2	95C2					PID2	
		Derivative time	15C3	95C3					PID2	
		Output low limit	15C4	95C4					1	
		Output high limit	15C5	95C5					1	
		Manual reset	15C6	95C6					1	
		Proportional band for cool side	15C7	95C7					1	
		Integration time for cool side	15C8	95C8					PID2	
		Derivative time for cool side	15C9	95C9					PID2	
		Output low limit for cool side	15CA	95CA					1	
		Output high limit for cool side	15CB	95CB					1	
		Initial output of PID control	15CC	95CC					1	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 2 recipe	SP6	LSP	15D0	95D0					LP2	
		Event 9 main setting	15D1	95D1					EV9	
		Event 9 sub-setting	15D2	95D2					EV9	
		Event 10 main setting	15D3	95D3					EV10	
		Event 10 sub-setting	15D4	95D4					EV10	
		Event 11 main setting	15D5	95D5					EV11	
		Event 11 sub-setting	15D6	95D6					EV11	
		Event 12 main setting	15D7	95D7					EV12	
		Event 12 sub-setting	15D8	95D8					EV12	
		Event 13 main setting	15D9	95D9					EV13	
		Event 13 sub-setting	15DA	95DA					EV13	
		Event 14 main setting	15DB	95DB					EV14	
		Event 14 sub-setting	15DC	95DC					EV14	
		Event 15 main setting	15DD	95DD					EV15	
		Event 15 sub-setting	15DE	95DE					EV15	
		Event 16 main setting	15DF	95DF					EV16	
		Event 16 sub-setting	15E0	95E0					EV16	
		Proportional band	15E1	95E1					1	
		Integral time	15E2	95E2					PID2	
		Derivative time	15E3	95E3					PID2	
		Output low limit	15E4	95E4					1	
		Output high limit	15E5	95E5					1	
		Manual reset	15E6	95E6					1	
		Proportional band for cool side	15E7	95E7					1	
		Integration time for cool side	15E8	95E8					PID2	
		Derivative time for cool side	15E9	95E9					PID2	
		Output low limit for cool side	15EA	95EA					1	
		Output high limit for cool side	15EB	95EB					1	
		Initial output of PID control	15EC	95EC					1	
	SP7	LSP	15F0	95F0					LP2	
		Event 9 main setting	15F1	95F1					EV9	
		Event 9 sub-setting	15F2	95F2					EV9	
		Event 10 main setting	15F3	95F3					EV10	
		Event 10 sub-setting	15F4	95F4					EV10	
		Event 11 main setting	15F5	95F5					EV11	
		Event 11 sub-setting	15F6	95F6					EV11	
		Event 12 main setting	15F7	95F7					EV12	
		Event 12 sub-setting	15F8	95F8					EV12	
		Event 13 main setting	15F9	95F9					EV13	
		Event 13 sub-setting	15FA	95FA					EV13	
		Event 14 main setting	15FB	95FB					EV14	
		Event 14 sub-setting	15FC	95FC					EV14	
		Event 15 main setting	15FD	95FD					EV15	
		Event 15 sub-setting	15FE	95FE					EV15	
		Event 16 main setting	15FF	95FF					EV16	
		Event 16 sub-setting	1600	9600					EV16	
		Proportional band	1601	9601					1	
		Integral time	1602	9602					PID2	
		Derivative time	1603	9603					PID2	
		Output low limit	1604	9604					1	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 2 recipe	SP7	Output high limit	1605	9605					1	
		Manual reset	1606	9606					1	
		Proportional band for cool side	1607	9607					1	
		Integration time for cool side	1608	9608					PID2	
		Derivative time for cool side	1609	9609					PID2	
		Output low limit for cool side	160A	960A					1	
		Output high limit for cool side	160B	960B					1	
		Initial output of PID control	160C	960C					1	
	SP8	LSP	1610	9610					LP2	
		Event 9 main setting	1611	9611					EV9	
		Event 9 sub-setting	1612	9612					EV9	
		Event 10 main setting	1613	9613					EV10	
		Event 10 sub-setting	1614	9614					EV10	
		Event 11 main setting	1615	9615					EV11	
		Event 11 sub-setting	1616	9616					EV11	
		Event 12 main setting	1617	9617					EV12	
		Event 12 sub-setting	1618	9618					EV12	
		Event 13 main setting	1619	9619					EV13	
		Event 13 sub-setting	161A	961A					EV13	
		Event 14 main setting	161B	961B					EV14	
		Event 14 sub-setting	161C	961C					EV14	
		Event 15 main setting	161D	961D					EV15	
		Event 15 sub-setting	161E	961E					EV15	
		Event 16 main setting	161F	961F					EV16	
		Event 16 sub-setting	1620	9620					EV16	
		Proportional band	1621	9621					1	
		Integral time	1622	9622					PID2	
		Derivative time	1623	9623					PID2	
		Output low limit	1624	9624					1	
		Output high limit	1625	9625					1	
		Manual reset	1626	9626					1	
		Proportional band for cool side	1627	9627					1	
		Integration time for cool side	1628	9628					PID2	
		Derivative time for cool side	1629	9629					PID2	
		Output low limit for cool side	162A	962A					1	
		Output high limit for cool side	162B	962B					1	
		Initial output of PID control	162C	962C					1	
	SP9	LSP	1630	9630					LP2	
		Event 9 main setting	1631	9631					EV9	
		Event 9 sub-setting	1632	9632					EV9	
		Event 10 main setting	1633	9633					EV10	
		Event 10 sub-setting	1634	9634					EV10	
		Event 11 main setting	1635	9635					EV11	
		Event 11 sub-setting	1636	9636					EV11	
		Event 12 main setting	1637	9637					EV12	
		Event 12 sub-setting	1638	9638					EV12	
		Event 13 main setting	1639	9639					EV13	
		Event 13 sub-setting	163A	963A					EV13	
		Event 14 main setting	163B	963B					EV14	
		Event 14 sub-setting	163C	963C					EV14	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 2 recipe	SP9	Event 15 main setting	163D	963D					EV15	
		Event 15 sub-setting	163E	963E					EV15	
		Event 16 main setting	163F	963F					EV16	
		Event 16 sub-setting	1640	9640					EV16	
		Proportional band	1641	9641					1	
		Integral time	1642	9642					PID2	
		Derivative time	1643	9643					PID2	
		Output low limit	1644	9644					1	
		Output high limit	1645	9645					1	
		Manual reset	1646	9646					1	
		Proportional band for cool side	1647	9647					1	
		Integration time for cool side	1648	9648					PID2	
		Derivative time for cool side	1649	9649					PID2	
		Output low limit for cool side	164A	964A					1	
		Output high limit for cool side	164B	964B					1	
		Initial output of PID control	164C	964C					1	
	SP10	LSP	1650	9650					LP2	
		Event 9 main setting	1651	9651					EV9	
		Event 9 sub-setting	1652	9652					EV9	
		Event 10 main setting	1653	9653					EV10	
		Event 10 sub-setting	1654	9654					EV10	
		Event 11 main setting	1655	9655					EV11	
		Event 11 sub-setting	1656	9656					EV11	
		Event 12 main setting	1657	9657					EV12	
		Event 12 sub-setting	1658	9658					EV12	
		Event 13 main setting	1659	9659					EV13	
		Event 13 sub-setting	165A	965A					EV13	
		Event 14 main setting	165B	965B					EV14	
		Event 14 sub-setting	165C	965C					EV14	
		Event 15 main setting	165D	965D					EV15	
		Event 15 sub-setting	165E	965E					EV15	
		Event 16 main setting	165F	965F					EV16	
		Event 16 sub-setting	1660	9660					EV16	
		Proportional band	1661	9661					1	
		Integral time	1662	9662					PID2	
		Derivative time	1663	9663					PID2	
		Output low limit	1664	9664					1	
		Output high limit	1665	9665					1	
		Manual reset	1666	9666					1	
		Proportional band for cool side	1667	9667					1	
		Integration time for cool side	1668	9668					PID2	
		Derivative time for cool side	1669	9669					PID2	
		Output low limit for cool side	166A	966A					1	
		Output high limit for cool side	166B	966B					1	
		Initial output of PID control	166C	966C					1	
	SP11	LSP	1670	9670					LP2	
		Event 9 main setting	1671	9671					EV9	
		Event 9 sub-setting	1672	9672					EV9	
		Event 10 main setting	1673	9673					EV10	
		Event 10 sub-setting	1674	9674					EV10	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 2 recipe	SP11	Event 11 main setting	1675	9675					EV11	
		Event 11 sub-setting	1676	9676					EV11	
		Event 12 main setting	1677	9677					EV12	
		Event 12 sub-setting	1678	9678					EV12	
		Event 13 main setting	1679	9679					EV13	
		Event 13 sub-setting	167A	967A					EV13	
		Event 14 main setting	167B	967B					EV14	
		Event 14 sub-setting	167C	967C					EV14	
		Event 15 main setting	167D	967D					EV15	
		Event 15 sub-setting	167E	967E					EV15	
		Event 16 main setting	167F	967F					EV16	
		Event 16 sub-setting	1680	9680					EV16	
		Proportional band	1681	9681					1	
		Integral time	1682	9682					PID2	
		Derivative time	1683	9683					PID2	
		Output low limit	1684	9684					1	
		Output high limit	1685	9685					1	
		Manual reset	1686	9686					1	
		Proportional band for cool side	1687	9687					1	
		Integration time for cool side	1688	9688					PID2	
		Derivative time for cool side	1689	9689					PID2	
		Output low limit for cool side	168A	968A					1	
		Output high limit for cool side	168B	968B					1	
		Initial output of PID control	168C	968C					1	
	SP12	LSP	1690	9690					LP2	
		Event 9 main setting	1691	9691					EV9	
		Event 9 sub-setting	1692	9692					EV9	
		Event 10 main setting	1693	9693					EV10	
		Event 10 sub-setting	1694	9694					EV10	
		Event 11 main setting	1695	9695					EV11	
		Event 11 sub-setting	1696	9696					EV11	
		Event 12 main setting	1697	9697					EV12	
		Event 12 sub-setting	1698	9698					EV12	
		Event 13 main setting	1699	9699					EV13	
		Event 13 sub-setting	169A	969A					EV13	
		Event 14 main setting	169B	969B					EV14	
		Event 14 sub-setting	169C	969C					EV14	
		Event 15 main setting	169D	969D					EV15	
		Event 15 sub-setting	169E	969E					EV15	
		Event 16 main setting	169F	969F					EV16	
		Event 16 sub-setting	16A0	96A0					EV16	
		Proportional band	16A1	96A1					1	
		Integral time	16A2	96A2					PID2	
		Derivative time	16A3	96A3					PID2	
		Output low limit	16A4	96A4					1	
		Output high limit	16A5	96A5					1	
		Manual reset	16A6	96A6					1	
		Proportional band for cool side	16A7	96A7					1	
		Integration time for cool side	16A8	96A8					PID2	
		Derivative time for cool side	16A9	96A9					PID2	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 2 recipe	SP12	Output low limit for cool side	16AA	96AA					1	
		Output high limit for cool side	16AB	96AB					1	
		Initial output of PID control	16AC	96AC					1	
	SP13	LSP	16B0	96B0					LP2	
		Event 9 main setting	16B1	96B1					EV9	
		Event 9 sub-setting	16B2	96B2					EV9	
		Event 10 main setting	16B3	96B3					EV10	
		Event 10 sub-setting	16B4	96B4					EV10	
		Event 11 main setting	16B5	96B5					EV11	
		Event 11 sub-setting	16B6	96B6					EV11	
		Event 12 main setting	16B7	96B7					EV12	
		Event 12 sub-setting	16B8	96B8					EV12	
		Event 13 main setting	16B9	96B9					EV13	
		Event 13 sub-setting	16BA	96BA					EV13	
		Event 14 main setting	16BB	96BB					EV14	
		Event 14 sub-setting	16BC	96BC					EV14	
		Event 15 main setting	16BD	96BD					EV15	
		Event 15 sub-setting	16BE	96BE					EV15	
		Event 16 main setting	16BF	96BF					EV16	
		Event 16 sub-setting	16C0	96C0					EV16	
		Proportional band	16C1	96C1					1	
		Integral time	16C2	96C2					PID2	
		Derivative time	16C3	96C3					PID2	
		Output low limit	16C4	96C4					1	
		Output high limit	16C5	96C5					1	
		Manual reset	16C6	96C6					1	
		Proportional band for cool side	16C7	96C7					1	
		Integration time for cool side	16C8	96C8					PID2	
		Derivative time for cool side	16C9	96C9					PID2	
		Output low limit for cool side	16CA	96CA					1	
		Output high limit for cool side	16CB	96CB					1	
		Initial output of PID control	16CC	96CC					1	
	SP14	LSP	16D0	96D0					LP2	
		Event 9 main setting	16D1	96D1					EV9	
		Event 9 sub-setting	16D2	96D2					EV9	
		Event 10 main setting	16D3	96D3					EV10	
		Event 10 sub-setting	16D4	96D4					EV10	
		Event 11 main setting	16D5	96D5					EV11	
		Event 11 sub-setting	16D6	96D6					EV11	
		Event 12 main setting	16D7	96D7					EV12	
		Event 12 sub-setting	16D8	96D8					EV12	
		Event 13 main setting	16D9	96D9					EV13	
		Event 13 sub-setting	16DA	96DA					EV13	
		Event 14 main setting	16DB	96DB					EV14	
		Event 14 sub-setting	16DC	96DC					EV14	
		Event 15 main setting	16DD	96DD					EV15	
		Event 15 sub-setting	16DE	96DE					EV15	
		Event 16 main setting	16DF	96DF					EV16	
		Event 16 sub-setting	16E0	96E0					EV16	
		Proportional band	16E1	96E1					1	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 2 recipe	SP14	Integral time	16E2	96E2					PID2	
		Derivative time	16E3	96E3					PID2	
		Output low limit	16E4	96E4					1	
		Output high limit	16E5	96E5					1	
		Manual reset	16E6	96E6					1	
		Proportional band for cool side	16E7	96E7					1	
		Integration time for cool side	16E8	96E8					PID2	
		Derivative time for cool side	16E9	96E9					PID2	
		Output low limit for cool side	16EA	96EA					1	
		Output high limit for cool side	16EB	96EB					1	
		Initial output of PID control	16EC	96EC					1	
	SP15	LSP	16F0	96F0					LP2	
		Event 9 main setting	16F1	96F1					EV9	
		Event 9 sub-setting	16F2	96F2					EV9	
		Event 10 main setting	16F3	96F3					EV10	
		Event 10 sub-setting	16F4	96F4					EV10	
		Event 11 main setting	16F5	96F5					EV11	
		Event 11 sub-setting	16F6	96F6					EV11	
		Event 12 main setting	16F7	96F7					EV12	
		Event 12 sub-setting	16F8	96F8					EV12	
		Event 13 main setting	16F9	96F9					EV13	
		Event 13 sub-setting	16FA	96FA					EV13	
		Event 14 main setting	16FB	96FB					EV14	
		Event 14 sub-setting	16FC	96FC					EV14	
		Event 15 main setting	16FD	96FD					EV15	
		Event 15 sub-setting	16FE	96FE					EV15	
		Event 16 main setting	16FF	96FF					EV16	
		Event 16 sub-setting	1700	9700					EV16	
		Proportional band	1701	9701					1	
		Integral time	1702	9702					PID2	
		Derivative time	1703	9703					PID2	
		Output low limit	1704	9704					1	
		Output high limit	1705	9705					1	
		Manual reset	1706	9706					1	
		Proportional band for cool side	1707	9707					1	
		Integration time for cool side	1708	9708					PID2	
		Derivative time for cool side	1709	9709					PID2	
		Output low limit for cool side	170A	970A					1	
		Output high limit for cool side	170B	970B					1	
		Initial output of PID control	170C	970C					1	
	SP16	LSP	1710	9710					LP2	
		Event 9 main setting	1711	9711					EV9	
		Event 9 sub-setting	1712	9712					EV9	
		Event 10 main setting	1713	9713					EV10	
		Event 10 sub-setting	1714	9714					EV10	
		Event 11 main setting	1715	9715					EV11	
		Event 11 sub-setting	1716	9716					EV11	
		Event 12 main setting	1717	9717					EV12	
		Event 12 sub-setting	1718	9718					EV12	
		Event 13 main setting	1719	9719					EV13	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 2 recipe	SP16	Event 13 sub-setting	171A	971A					EV13	
		Event 14 main setting	171B	971B					EV14	
		Event 14 sub-setting	171C	971C					EV14	
		Event 15 main setting	171D	971D					EV15	
		Event 15 sub-setting	171E	971E					EV15	
		Event 16 main setting	171F	971F					EV16	
		Event 16 sub-setting	1720	9720					EV16	
		Proportional band	1721	9721					1	
		Integral time	1722	9722					PID2	
		Derivative time	1723	9723					PID2	
		Output low limit	1724	9724					1	
		Output high limit	1725	9725					1	
		Manual reset	1726	9726					1	
		Proportional band for cool side	1727	9727					1	
		Integration time for cool side	1728	9728					PID2	
		Derivative time for cool side	1729	9729					PID2	
		Output low limit for cool side	172A	972A					1	
		Output high limit for cool side	172B	972B					1	
		Initial output of PID control	172C	972C					1	
Mode	Loop 1	RUN/READY	1B30	9B30		□		□	–	0:RUN 1:READY
		AUTO/MANUAL	1B31	9B31		□		□	–	0:AUTO 1:MANUAL
		AT stop/start	1B32	9B32		□		□	–	0:AT stop 1:AT start
		LSP/RSP	1B33	9B33		□		□	–	0:LSP 1:RSP
		Backup/through output	1B34	9B34		□		□	–	0:Backup 1:Through output
	Loop 2	RUN/READY	1B40	9B40		□		□	–	0:RUN 1:READY
		AUTO/MANUAL	1B41	9B41		□		□	–	0:AUTO 1:MANUAL
		AT stop/start	1B42	9B42		□		□	–	0:AT stop 1:AT start
		LSP/RSP	1B43	9B43		□		□	–	0:LSP 1:RSP
		Backup/through output	1B44	9B44		□		□	–	0:Backup 1:Through output
Loop 1 PID	PID1	Proportional band	1B70	9B70					1	
		Integral time	1B71	9B71					PID1	
		Derivative time	1B72	9B72					PID1	
		Output low limit	1B73	9B73					1	
		Output high limit	1B74	9B74					1	
		Manual reset	1B75	9B75					1	
		Proportional band for cool side	1B76	9B76					1	
		Integration time for cool side	1B77	9B77					PID1	
		Derivative time for cool side	1B78	9B78					PID1	
		Output low limit for cool side	1B79	9B79					1	
		Output high limit for cool side	1B7A	9B7A					1	
	PID2	Proportional band	1B80	9B80					1	
		Integral time	1B81	9B81					PID1	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 1	PID2	Derivative time	1B82	9B82					PID1	
PID		Output low limit	1B83	9B83					1	
		Output high limit	1B84	9B84					1	
		Manual reset	1B85	9B85					1	
		Proportional band for cool side	1B86	9B86					1	
		Integration time for cool side	1B87	9B87					PID1	
		Derivative time for cool side	1B88	9B88					PID1	
		Output low limit for cool side	1B89	9B89					1	
		Output high limit for cool side	1B8A	9B8A					1	
	PID3	Proportional band	1B90	9B90					1	
		Integral time	1B91	9B91					PID1	
		Derivative time	1B92	9B92					PID1	
		Output low limit	1B93	9B93					1	
		Output high limit	1B94	9B94					1	
		Manual reset	1B95	9B95					1	
		Proportional band for cool side	1B96	9B96					1	
		Integration time for cool side	1B97	9B97					PID1	
		Derivative time for cool side	1B98	9B98					PID1	
		Output low limit for cool side	1B99	9B99					1	
		Output high limit for cool side	1B9A	9B9A					1	
	PID4	Proportional band	1BA0	9BA0					1	
		Integral time	1BA1	9BA1					PID1	
		Derivative time	1BA2	9BA2					PID1	
		Output low limit	1BA3	9BA3					1	
		Output high limit	1BA4	9BA4					1	
		Manual reset	1BA5	9BA5					1	
		Proportional band for cool side	1BA6	9BA6					1	
		Integration time for cool side	1BA7	9BA7					PID1	
		Derivative time for cool side	1BA8	9BA8					PID1	
		Output low limit for cool side	1BA9	9BA9					1	
		Output high limit for cool side	1BAA	9BAA					1	
	PID5	Proportional band	1BB0	9BB0					1	
		Integral time	1BB1	9BB1					PID1	
		Derivative time	1BB2	9BB2					PID1	
		Output low limit	1BB3	9BB3					1	
		Output high limit	1BB4	9BB4					1	
		Manual reset	1BB5	9BB5					1	
		Proportional band for cool side	1BB6	9BB6					1	
		Integration time for cool side	1BB7	9BB7					PID1	
		Derivative time for cool side	1BB8	9BB8					PID1	
		Output low limit for cool side	1BB9	9BB9					1	
		Output high limit for cool side	1BBA	9BBA					1	
	PID6	Proportional band	1BC0	9BC0					1	
		Integral time	1BC1	9BC1					PID1	
		Derivative time	1BC2	9BC2					PID1	
		Output low limit	1BC3	9BC3					1	
		Output high limit	1BC4	9BC4					1	
		Manual reset	1BC5	9BC5					1	
		Proportional band for cool side	1BC6	9BC6					1	
		Integration time for cool side	1BC7	9BC7					PID1	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 1 PID	PID6	Derivative time for cool side	1BC8	9BC8					PID1	
		Output low limit for cool side	1BC9	9BC9					1	
		Output high limit for cool side	1BCA	9BCA					1	
	PID7	Proportional band	1BD0	9BD0					1	
		Integral time	1BD1	9BD1					PID1	
		Derivative time	1BD2	9BD2					PID1	
		Output low limit	1BD3	9BD3					1	
		Output high limit	1BD4	9BD4					1	
		Manual reset	1BD5	9BD5					1	
		Proportional band for cool side	1BD6	9BD6					1	
		Integration time for cool side	1BD7	9BD7					PID1	
		Derivative time for cool side	1BD8	9BD8					PID1	
		Output low limit for cool side	1BD9	9BD9					1	
		Output high limit for cool side	1BDA	9BDA					1	
	PID8	Proportional band	1BE0	9BE0					1	
		Integral time	1BE1	9BE1					PID1	
		Derivative time	1BE2	9BE2					PID1	
		Output low limit	1BE3	9BE3					1	
		Output high limit	1BE4	9BE4					1	
		Manual reset	1BE5	9BE5					1	
		Proportional band for cool side	1BE6	9BE6					1	
		Integration time for cool side	1BE7	9BE7					PID1	
		Derivative time for cool side	1BE8	9BE8					PID1	
		Output low limit for cool side	1BE9	9BE9					1	
		Output high limit for cool side	1BEA	9BEA					1	
	PID9	Proportional band	1BF0	9BF0					1	
		Integral time	1BF1	9BF1					PID1	
		Derivative time	1BF2	9BF2					PID1	
		Output low limit	1BF3	9BF3					1	
		Output high limit	1BF4	9BF4					1	
		Manual reset	1BF5	9BF5					1	
		Proportional band for cool side	1BF6	9BF6					1	
		Integration time for cool side	1BF7	9BF7					PID1	
		Derivative time for cool side	1BF8	9BF8					PID1	
		Output low limit for cool side	1BF9	9BF9					1	
		Output high limit for cool side	1BFA	9BFA					1	
	PID10	Proportional band	1C00	9C00					1	
		Integral time	1C01	9C01					PID1	
		Derivative time	1C02	9C02					PID1	
		Output low limit	1C03	9C03					1	
		Output high limit	1C04	9C04					1	
		Manual reset	1C05	9C05					1	
		Proportional band for cool side	1C06	9C06					1	
		Integration time for cool side	1C07	9C07					PID1	
		Derivative time for cool side	1C08	9C08					PID1	
		Output low limit for cool side	1C09	9C09					1	
		Output high limit for cool side	1C0A	9C0A					1	
	PID11	Proportional band	1C10	9C10					1	
		Integral time	1C11	9C11					PID1	
		Derivative time	1C12	9C12					PID1	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 1	PID11	Output low limit	1C13	9C13					1	
PID		Output high limit	1C14	9C14					1	
		Manual reset	1C15	9C15					1	
		Proportional band for cool side	1C16	9C16					1	
		Integration time for cool side	1C17	9C17					PID1	
		Derivative time for cool side	1C18	9C18					PID1	
		Output low limit for cool side	1C19	9C19					1	
		Output high limit for cool side	1C1A	9C1A					1	
	PID12	Proportional band	1C20	9C20					1	
		Integral time	1C21	9C21					PID1	
		Derivative time	1C22	9C22					PID1	
		Output low limit	1C23	9C23					1	
		Output high limit	1C24	9C24					1	
		Manual reset	1C25	9C25					1	
		Proportional band for cool side	1C26	9C26					1	
		Integration time for cool side	1C27	9C27					PID1	
		Derivative time for cool side	1C28	9C28					PID1	
		Output low limit for cool side	1C29	9C29					1	
		Output high limit for cool side	1C2A	9C2A					1	
	PID13	Proportional band	1C30	9C30					1	
		Integral time	1C31	9C31					PID1	
		Derivative time	1C32	9C32					PID1	
		Output low limit	1C33	9C33					1	
		Output high limit	1C34	9C34					1	
		Manual reset	1C35	9C35					1	
		Proportional band for cool side	1C36	9C36					1	
		Integration time for cool side	1C37	9C37					PID1	
		Derivative time for cool side	1C38	9C38					PID1	
		Output low limit for cool side	1C39	9C39					1	
		Output high limit for cool side	1C3A	9C3A					1	
	PID14	Proportional band	1C40	9C40					1	
		Integral time	1C41	9C41					PID1	
		Derivative time	1C42	9C42					PID1	
		Output low limit	1C43	9C43					1	
		Output high limit	1C44	9C44					1	
		Manual reset	1C45	9C45					1	
		Proportional band for cool side	1C46	9C46					1	
		Integration time for cool side	1C47	9C47					PID1	
		Derivative time for cool side	1C48	9C48					PID1	
		Output low limit for cool side	1C49	9C49					1	
		Output high limit for cool side	1C4A	9C4A					1	
	PID15	Proportional band	1C50	9C50					1	
		Integral time	1C51	9C51					PID1	
		Derivative time	1C52	9C52					PID1	
		Output low limit	1C53	9C53					1	
		Output high limit	1C54	9C54					1	
		Manual reset	1C55	9C55					1	
		Proportional band for cool side	1C56	9C56					1	
		Integration time for cool side	1C57	9C57					PID1	
		Derivative time for cool side	1C58	9C58					PID1	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 1 PID	PID15	Output low limit for cool side	1C59	9C59					1	
		Output high limit for cool side	1C5A	9C5A					1	
	PID16	Proportional band	1C60	9C60					1	
		Integral time	1C61	9C61					PID1	
		Derivative time	1C62	9C62					PID1	
		Output low limit	1C63	9C63					1	
		Output high limit	1C64	9C64					1	
		Manual reset	1C65	9C65					1	
		Proportional band for cool side	1C66	9C66					1	
		Integration time for cool side	1C67	9C67					PID1	
		Derivative time for cool side	1C68	9C68					PID1	
		Output low limit for cool side	1C69	9C69					1	
		Output high limit for cool side	1C6A	9C6A					1	
Loop 2 PID	PID1	Proportional band	1C70	9C70					1	
		Integral time	1C71	9C71					PID2	
		Derivative time	1C72	9C72					PID2	
		Output low limit	1C73	9C73					1	
		Output high limit	1C74	9C74					1	
		Manual reset	1C75	9C75					1	
		Proportional band for cool side	1C76	9C76					1	
		Integration time for cool side	1C77	9C77					PID2	
		Derivative time for cool side	1C78	9C78					PID2	
		Output low limit for cool side	1C79	9C79					1	
		Output high limit for cool side	1C7A	9C7A					1	
	PID2	Proportional band	1C80	9C80					1	
		Integral time	1C81	9C81					PID2	
		Derivative time	1C82	9C82					PID2	
		Output low limit	1C83	9C83					1	
		Output high limit	1C84	9C84					1	
		Manual reset	1C85	9C85					1	
		Proportional band for cool side	1C86	9C86					1	
		Integration time for cool side	1C87	9C87					PID2	
		Derivative time for cool side	1C88	9C88					PID2	
		Output low limit for cool side	1C89	9C89					1	
		Output high limit for cool side	1C8A	9C8A					1	
	PID3	Proportional band	1C90	9C90					1	
		Integral time	1C91	9C91					PID2	
		Derivative time	1C92	9C92					PID2	
		Output low limit	1C93	9C93					1	
		Output high limit	1C94	9C94					1	
		Manual reset	1C95	9C95					1	
		Proportional band for cool side	1C96	9C96					1	
		Integration time for cool side	1C97	9C97					PID2	
		Derivative time for cool side	1C98	9C98					PID2	
		Output low limit for cool side	1C99	9C99					1	
		Output high limit for cool side	1C9A	9C9A					1	
	PID4	Proportional band	1CA0	9CA0					1	
		Integral time	1CA1	9CA1					PID2	
		Derivative time	1CA2	9CA2					PID2	
		Output low limit	1CA3	9CA3					1	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 2	PID4	Output high limit	1CA4	9CA4					1	
PID		Manual reset	1CA5	9CA5					1	
		Proportional band for cool side	1CA6	9CA6					1	
		Integration time for cool side	1CA7	9CA7					PID2	
		Derivative time for cool side	1CA8	9CA8					PID2	
		Output low limit for cool side	1CA9	9CA9					1	
		Output high limit for cool side	1CAA	9CAA					1	
	PID5	Proportional band	1CB0	9CB0					1	
		Integral time	1CB1	9CB1					PID2	
		Derivative time	1CB2	9CB2					PID2	
		Output low limit	1CB3	9CB3					1	
		Output high limit	1CB4	9CB4					1	
		Manual reset	1CB5	9CB5					1	
		Proportional band for cool side	1CB6	9CB6					1	
		Integration time for cool side	1CB7	9CB7					PID2	
		Derivative time for cool side	1CB8	9CB8					PID2	
		Output low limit for cool side	1CB9	9CB9					1	
		Output high limit for cool side	1CBA	9CBA					1	
	PID6	Proportional band	1CC0	9CC0					1	
		Integral time	1CC1	9CC1					PID2	
		Derivative time	1CC2	9CC2					PID2	
		Output low limit	1CC3	9CC3					1	
		Output high limit	1CC4	9CC4					1	
		Manual reset	1CC5	9CC5					1	
		Proportional band for cool side	1CC6	9CC6					1	
		Integration time for cool side	1CC7	9CC7					PID2	
		Derivative time for cool side	1CC8	9CC8					PID2	
		Output low limit for cool side	1CC9	9CC9					1	
		Output high limit for cool side	1CCA	9CCA					1	
	PID7	Proportional band	1CD0	9CD0					1	
		Integral time	1CD1	9CD1					PID2	
		Derivative time	1CD2	9CD2					PID2	
		Output low limit	1CD3	9CD3					1	
		Output high limit	1CD4	9CD4					1	
		Manual reset	1CD5	9CD5					1	
		Proportional band for cool side	1CD6	9CD6					1	
		Integration time for cool side	1CD7	9CD7					PID2	
		Derivative time for cool side	1CD8	9CD8					PID2	
		Output low limit for cool side	1CD9	9CD9					1	
		Output high limit for cool side	1CDA	9CDA					1	
	PID8	Proportional band	1CE0	9CE0					1	
		Integral time	1CE1	9CE1					PID2	
		Derivative time	1CE2	9CE2					PID2	
		Output low limit	1CE3	9CE3					1	
		Output high limit	1CE4	9CE4					1	
		Manual reset	1CE5	9CE5					1	
		Proportional band for cool side	1CE6	9CE6					1	
		Integration time for cool side	1CE7	9CE7					PID2	
		Derivative time for cool side	1CE8	9CE8					PID2	
		Output low limit for cool side	1CE9	9CE9					1	
		Output high limit for cool side	1CEA	9CEA					1	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 2 PID	PID9	Proportional band	1CF0	9CF0					1	
		Integral time	1CF1	9CF1					PID2	
		Derivative time	1CF2	9CF2					PID2	
		Output low limit	1CF3	9CF3					1	
		Output high limit	1CF4	9CF4					1	
		Manual reset	1CF5	9CF5					1	
		Proportional band for cool side	1CF6	9CF6					1	
		Integration time for cool side	1CF7	9CF7					PID2	
		Derivative time for cool side	1CF8	9CF8					PID2	
		Output low limit for cool side	1CF9	9CF9					1	
		Output high limit for cool side	1CFA	9CFA					1	
	PID10	Proportional band	1D00	9D00					1	
		Integral time	1D01	9D01					PID2	
		Derivative time	1D02	9D02					PID2	
		Output low limit	1D03	9D03					1	
		Output high limit	1D04	9D04					1	
		Manual reset	1D05	9D05					1	
		Proportional band for cool side	1D06	9D06					1	
		Integration time for cool side	1D07	9D07					PID2	
		Derivative time for cool side	1D08	9D08					PID2	
		Output low limit for cool side	1D09	9D09					1	
		Output high limit for cool side	1D0A	9D0A					1	
	PID11	Proportional band	1D10	9D10					1	
		Integral time	1D11	9D11					PID2	
		Derivative time	1D12	9D12					PID2	
		Output low limit	1D13	9D13					1	
		Output high limit	1D14	9D14					1	
		Manual reset	1D15	9D15					1	
		Proportional band for cool side	1D16	9D16					1	
		Integration time for cool side	1D17	9D17					PID2	
		Derivative time for cool side	1D18	9D18					PID2	
		Output low limit for cool side	1D19	9D19					1	
		Output high limit for cool side	1D1A	9D1A					1	
	PID12	Proportional band	1D20	9D20					1	
		Integral time	1D21	9D21					PID2	
		Derivative time	1D22	9D22					PID2	
		Output low limit	1D23	9D23					1	
		Output high limit	1D24	9D24					1	
		Manual reset	1D25	9D25					1	
		Proportional band for cool side	1D26	9D26					1	
		Integration time for cool side	1D27	9D27					PID2	
		Derivative time for cool side	1D28	9D28					PID2	
		Output low limit for cool side	1D29	9D29					1	
		Output high limit for cool side	1D2A	9D2A					1	
	PID13	Proportional band	1D30	9D30					1	
		Integral time	1D31	9D31					PID2	
		Derivative time	1D32	9D32					PID2	
		Output low limit	1D33	9D33					1	
		Output high limit	1D34	9D34					1	
		Manual reset	1D35	9D35					1	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Loop 2 PID	PID13	Proportional band for cool side	1D36	9D36					1	
		ntegration time for cool side	1D37	9D37					PID2	
		Derivative time for cool side	1D38	9D38					PID2	
		Output low limit for cool side	1D39	9D39					1	
		Output high limit for cool side	1D3A	9D3A					1	
	PID14	Proportional band	1D40	9D40					1	
		Integral time	1D41	9D41					PID2	
		Derivative time	1D42	9D42					PID2	
		Output low limit	1D43	9D43					1	
		Output high limit	1D44	9D44					1	
		Manual reset	1D45	9D45					1	
		Proportional band for cool side	1D46	9D46					1	
		Integration time for cool side	1D47	9D47					PID2	
		Derivative time for cool side	1D48	9D48					PID2	
		Output low limit for cool side	1D49	9D49					1	
		Output high limit for cool side	1D4A	9D4A					1	
	PID15	Proportional band	1D50	9D50					1	
		Integral time	1D51	9D51					PID2	
		Derivative time	1D52	9D52					PID2	
		Output low limit	1D53	9D53					1	
		Output high limit	1D54	9D54					1	
		Manual reset	1D55	9D55					1	
		Proportional band for cool side	1D56	9D56					1	
		Integration time for cool side	1D57	9D57					PID2	
		Derivative time for cool side	1D58	9D58					PID2	
		Output low limit for cool side	1D59	9D59					1	
		Output high limit for cool side	1D5A	9D5A					1	
	PID16	Proportional band	1D60	9D60					1	
		Integral time	1D61	9D61					PID2	
		Derivative time	1D62	9D62					PID2	
		Output low limit	1D63	9D63					1	
		Output high limit	1D64	9D64					1	
		Manual reset	1D65	9D65					1	
		Proportional band for cool side	1D66	9D66					1	
		Integration time for cool side	1D67	9D67					PID2	
		Derivative time for cool side	1D68	9D68					PID2	
		Output low limit for cool side	1D69	9D69					1	
		Output high limit for cool side	1D6A	9D6A					1	
Control	Loop 1	Loop PV/SP decimal point position	1F70	9F70					–	
		(Reserved for future extension.)	1F71	9F71	×	×	×	×	–	
		Control action	1F72	9F72					–	
		Control algorithm	1F73	9F73					–	
		Control range low limit	1F74	9F74					LP1	
		Control range high limit	1F75	9F75					LP1	
		AT type	1F76	9F76					–	
		Heat/cool control dead zone	1F77	9F77					1	
		Initial output of PID control	1F78	9F78					1	
	Loop 2	Loop PV/SP decimal point position	1F80	9F80					–	
		(Reserved for future use.)	1F81	9F81	×	×	×	×	–	
		Control action	1F82	9F82					–	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Control	Loop 2	Control algorithm	1F83	9F83					–	
		Control range low limit	1F84	9F84					LP2	
		Control range high limit	1F85	9F85					LP2	
		AT type	1F86	9F86					–	
		Heat/cool control dead zone	1F87	9F87					1	
		Initial output of PID control	1F88	9F88					1	
	Loop 1	PID control initialization	1FB0	9FB0					–	
		Integration time/derivative time decimal point position	1FB1	9FB1					–	
		Output operation at changing Auto/Manual	1FB2	9FB2					–	
		Preset MANUAL value	1FB3	9FB3					1	
		MV increase change limit	1FB4	9FB4					2	
		MV decrease change limit	1FB5	9FB5					2	
		Heat/cool selection	1FB6	9FB6					–	
		MV low limit at AT	1FB7	9FB7					1	
		MV high limit at AT	1FB8	9FB8					1	
		(Reserved for future use.)	1FB9	9FB9	×	×	×	×	–	
		(Reserved for future use.)	1FBA	9FBA	×	×	×	×	–	
		Zone action selection	1FBB	9FBB					–	
		Zone 1	1FBC	9FBC					LP1	
		Zone 2	1FBD	9FBD					LP1	
		Zone 3	1FBE	9FBE					LP1	
		Zone 4	1FBF	9FBF					LP1	
		Zone 5	1FC0	9FC0					LP1	
		Zone 6	1FC1	9FC1					LP1	
		Zone 7	1FC2	9FC2					LP1	
		Zone hysteresis	1FC3	9FC3					LP1	
		(Reserved for future use.)	1FC4	9FC4	×	×	×	×	–	
	Loop 2	PID control initialization	1FD0	9FD0					–	
		Integration time/derivative time decimal point position	1FD1	9FD1					–	
		Output operation at changing Auto/Manual	1FD2	9FD2					–	
		Preset MANUAL value	1FD3	9FD3					1	
		MV increase change limit	1FD4	9FD4					2	
		MV decrease change limit	1FD5	9FD5					2	
		Heat/cool selection	1FD6	9FD6					–	
		MV low limit at AT	1FD7	9FD7					1	
		MV high limit at AT	1FD8	9FD8					1	
		(Reserved for future use.)	1FD9	9FD9	×	×	×	×	–	
		(Reserved for future use.)	1FDA	9FDA	×	×	×	×	–	
		Zone action selection	1FDB	9FDB					–	
		Zone 1	1FDC	9FDC					LP2	
		Zone 2	1FDD	9FDD					LP2	
		Zone 3	1FDE	9FDE					LP2	
		Zone 4	1FDF	9FDF					LP2	
		Zone 5	1FE0	9FE0					LP2	
		Zone 6	1FE1	9FE1					LP2	
		Zone 7	1FE2	9FE2					LP2	
		Zone hysteresis	1FE3	9FE3					LP2	
		(Reserved for future use.)	1FE4	9FE4	×	×	×	×	–	
MV	Loop 1	Output at READY	20B0	A0B0					1	
		Output at READY (Heat)	20B1	A0B1					1	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
MV	Loop 1	Output at READY (Cool)	20B2	A0B2					1	
		Output operation at PV alarm	20B3	A0B3					–	
		Output at PV alarm	20B4	A0B4					1	
		Fixed value output 1	20B5	A0B5					1	
		Fixed value output 2	20B6	A0B6					1	
		Fixed value output 3	20B7	A0B7					1	
		Fixed value output 4	20B8	A0B8					1	
		Fixed value output 5	20B9	A0B9					1	
		Fixed value output 6	20BA	A0BA					1	
		Fixed value output 7	20BB	A0BB					1	
		Fixed value output 8	20BC	A0BC					1	
	Loop 2	Output at READY	20C0	A0C0					1	
		Output at READY (Heat)	20C1	A0C1					1	
		Output at READY (Cool)	20C2	A0C2					1	
		Output operation at PV alarm	20C3	A0C3					–	
		Output at PV alarm	20C4	A0C4					1	
		Fixed value output 1	20C5	A0C5					1	
		Fixed value output 2	20C6	A0C6					1	
		Fixed value output 3	20C7	A0C7					1	
		Fixed value output 4	20C8	A0C8					1	
		Fixed value output 5	20C9	A0C9					1	
		Fixed value output 6	20CA	A0CA					1	
		Fixed value output 7	20CB	A0CB					1	
		Fixed value output 8	20CC	A0CC					1	
Linearization table	Linearization 1	Breakpoint decimal point position	20F0	A0F0					–	
		Breakpoint A1	20F1	A0F1					Linearization 1	
		Breakpoint A2	20F2	A0F2					Linearization 1	
		Breakpoint A3	20F3	A0F3					Linearization 1	
		Breakpoint A4	20F4	A0F4					Linearization 1	
		Breakpoint A5	20F5	A0F5					Linearization 1	
		Breakpoint A6	20F6	A0F6					Linearization 1	
		Breakpoint A7	20F7	A0F7					Linearization 1	
		Breakpoint A8	20F8	A0F8					Linearization 1	
		Breakpoint A9	20F9	A0F9					Linearization 1	
		Breakpoint A10	20FA	A0FA					Linearization 1	
		Breakpoint A11	20FB	A0FB					Linearization 1	
		Breakpoint A12	20FC	A0FC					Linearization 1	
		Breakpoint A13	20FD	A0FD					Linearization 1	
		Breakpoint A14	20FE	A0FE					Linearization 1	
		Breakpoint A15	20FF	A0FF					Linearization 1	
		Breakpoint A16	2100	A100					Linearization 1	
		Breakpoint A17	2101	A101					Linearization 1	
		Breakpoint A18	2102	A102					Linearization 1	
		Breakpoint A19	2103	A103					Linearization 1	
		Breakpoint A20	2104	A104					Linearization 1	
		Breakpoint B1	2105	A105					Linearization 1	
		Breakpoint B2	2106	A106					Linearization 1	
		Breakpoint B3	2107	A107					Linearization 1	
		Breakpoint B4	2108	A108					Linearization 1	
		Breakpoint B5	2109	A109					Linearization 1	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Linearization table	Linearization 1	Breakpoint B6	210A	A10A					Linearization 1	
		Breakpoint B7	210B	A10B					Linearization 1	
		Breakpoint B8	210C	A10C					Linearization 1	
		Breakpoint B9	210D	A10D					Linearization 1	
		Breakpoint B10	210E	A10E					Linearization 1	
		Breakpoint B11	210F	A10F					Linearization 1	
		Breakpoint B12	2110	A110					Linearization 1	
		Breakpoint B13	2111	A111					Linearization 1	
		Breakpoint B14	2112	A112					Linearization 1	
		Breakpoint B15	2113	A113					Linearization 1	
		Breakpoint B16	2114	A114					Linearization 1	
		Breakpoint B17	2115	A115					Linearization 1	
		Breakpoint B18	2116	A116					Linearization 1	
		Breakpoint B19	2117	A117					Linearization 1	
		Breakpoint B20	2118	A118					Linearization 1	
	Linearization 2	Breakpoint decimal point position	2120	A120					–	
		Breakpoint A1	2121	A121					Linearization 2	
		Breakpoint A2	2122	A122					Linearization 2	
		Breakpoint A3	2123	A123					Linearization 2	
		Breakpoint A4	2124	A124					Linearization 2	
		Breakpoint A5	2125	A125					Linearization 2	
		Breakpoint A6	2126	A126					Linearization 2	
		Breakpoint A7	2127	A127					Linearization 2	
		Breakpoint A8	2128	A128					Linearization 2	
		Breakpoint A9	2129	A129					Linearization 2	
		Breakpoint A10	212A	A12A					Linearization 2	
		Breakpoint A11	212B	A12B					Linearization 2	
		Breakpoint A12	212C	A12C					Linearization 2	
		Breakpoint A13	212D	A12D					Linearization 2	
		Breakpoint A14	212E	A12E					Linearization 2	
		Breakpoint A15	212F	A12F					Linearization 2	
		Breakpoint A16	2130	A130					Linearization 2	
		Breakpoint A17	2131	A131					Linearization 2	
		Breakpoint A18	2132	A132					Linearization 2	
		Breakpoint A19	2133	A133					Linearization 2	
		Breakpoint A20	2134	A134					Linearization 2	
		Breakpoint B1	2135	A135					Linearization 2	
		Breakpoint B2	2136	A136					Linearization 2	
		Breakpoint B3	2137	A137					Linearization 2	
		Breakpoint B4	2138	A138					Linearization 2	
		Breakpoint B5	2139	A139					Linearization 2	
		Breakpoint B6	213A	A13A					Linearization 2	
		Breakpoint B7	213B	A13B					Linearization 2	
		Breakpoint B8	213C	A13C					Linearization 2	
		Breakpoint B9	213D	A13D					Linearization 2	
		Breakpoint B10	213E	A13E					Linearization 2	
		Breakpoint B11	213F	A13F					Linearization 2	
		Breakpoint B12	2140	A140					Linearization 2	
		Breakpoint B13	2141	A141					Linearization 2	
		Breakpoint B14	2142	A142					Linearization 2	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Linearization table	Linearization 2	Breakpoint B15	2143	A143					Linearization 2	
		Breakpoint B16	2144	A144					Linearization 2	
		Breakpoint B17	2145	A145					Linearization 2	
		Breakpoint B18	2146	A146					Linearization 2	
		Breakpoint B19	2147	A147					Linearization 2	
		Breakpoint B20	2148	A148					Linearization 2	
	Linearization 3	Breakpoint decimal point position	2150	A150					–	
		Breakpoint A1	2151	A151					Linearization 3	
		Breakpoint A2	2152	A152					Linearization 3	
		Breakpoint A3	2153	A153					Linearization 3	
		Breakpoint A4	2154	A154					Linearization 3	
		Breakpoint A5	2155	A155					Linearization 3	
		Breakpoint A6	2156	A156					Linearization 3	
		Breakpoint A7	2157	A157					Linearization 3	
		Breakpoint A8	2158	A158					Linearization 3	
		Breakpoint A9	2159	A159					Linearization 3	
		Breakpoint A10	215A	A15A					Linearization 3	
		Breakpoint A11	215B	A15B					Linearization 3	
		Breakpoint A12	215C	A15C					Linearization 3	
		Breakpoint A13	215D	A15D					Linearization 3	
		Breakpoint A14	215E	A15E					Linearization 3	
		Breakpoint A15	215F	A15F					Linearization 3	
		Breakpoint A16	2160	A160					Linearization 3	
		Breakpoint A17	2161	A161					Linearization 3	
		Breakpoint A18	2162	A162					Linearization 3	
		Breakpoint A19	2163	A163					Linearization 3	
		Breakpoint A20	2164	A164					Linearization 3	
		Breakpoint B1	2165	A165					Linearization 3	
		Breakpoint B2	2166	A166					Linearization 3	
		Breakpoint B3	2167	A167					Linearization 3	
		Breakpoint B4	2168	A168					Linearization 3	
		Breakpoint B5	2169	A169					Linearization 3	
		Breakpoint B6	216A	A16A					Linearization 3	
		Breakpoint B7	216B	A16B					Linearization 3	
		Breakpoint B8	216C	A16C					Linearization 3	
		Breakpoint B9	216D	A16D					Linearization 3	
		Breakpoint B10	216E	A16E					Linearization 3	
		Breakpoint B11	216F	A16F					Linearization 3	
		Breakpoint B12	2170	A170					Linearization 3	
		Breakpoint B13	2171	A171					Linearization 3	
		Breakpoint B14	2172	A172					Linearization 3	
		Breakpoint B15	2173	A173					Linearization 3	
		Breakpoint B16	2174	A174					Linearization 3	
		Breakpoint B17	2175	A175					Linearization 3	
		Breakpoint B18	2176	A176					Linearization 3	
		Breakpoint B19	2177	A177					Linearization 3	
		Breakpoint B20	2178	A178					Linearization 3	
	Linearization 4	Breakpoint decimal point position	2180	A180					–	
		Breakpoint A1	2181	A181					Linearization 4	
		Breakpoint A2	2182	A182					Linearization 4	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Linearization table	Linearization 4	Breakpoint A3	2183	A183					Linearization 4	
		Breakpoint A4	2184	A184					Linearization 4	
		Breakpoint A5	2185	A185					Linearization 4	
		Breakpoint A6	2186	A186					Linearization 4	
		Breakpoint A7	2187	A187					Linearization 4	
		Breakpoint A8	2188	A188					Linearization 4	
		Breakpoint A9	2189	A189					Linearization 4	
		Breakpoint A10	218A	A18A					Linearization 4	
		Breakpoint A11	218B	A18B					Linearization 4	
		Breakpoint A12	218C	A18C					Linearization 4	
		Breakpoint A13	218D	A18D					Linearization 4	
		Breakpoint A14	218E	A18E					Linearization 4	
		Breakpoint A15	218F	A18F					Linearization 4	
		Breakpoint A16	2190	A190					Linearization 4	
		Breakpoint A17	2191	A191					Linearization 4	
		Breakpoint A18	2192	A192					Linearization 4	
		Breakpoint A19	2193	A193					Linearization 4	
		Breakpoint A20	2194	A194					Linearization 4	
		Breakpoint B1	2195	A195					Linearization 4	
		Breakpoint B2	2196	A196					Linearization 4	
		Breakpoint B3	2197	A197					Linearization 4	
		Breakpoint B4	2198	A198					Linearization 4	
		Breakpoint B5	2199	A199					Linearization 4	
		Breakpoint B6	219A	A19A					Linearization 4	
		Breakpoint B7	219B	A19B					Linearization 4	
		Breakpoint B8	219C	A19C					Linearization 4	
		Breakpoint B9	219D	A19D					Linearization 4	
		Breakpoint B10	219E	A19E					Linearization 4	
		Breakpoint B11	219F	A19F					Linearization 4	
		Breakpoint B12	21A0	A1A0					Linearization 4	
		Breakpoint B13	21A1	A1A1					Linearization 4	
		Breakpoint B14	21A2	A1A2					Linearization 4	
		Breakpoint B15	21A3	A1A3					Linearization 4	
		Breakpoint B16	21A4	A1A4					Linearization 4	
		Breakpoint B17	21A5	A1A5					Linearization 4	
		Breakpoint B18	21A6	A1A6					Linearization 4	
		Breakpoint B19	21A7	A1A7					Linearization 4	
		Breakpoint B20	21A8	A1A8					Linearization 4	
	Linearization 5	Breakpoint decimal point position	21B0	A1B0					–	
		Breakpoint A1	21B1	A1B1					Linearization 5	
		Breakpoint A2	21B2	A1B2					Linearization 5	
		Breakpoint A3	21B3	A1B3					Linearization 5	
		Breakpoint A4	21B4	A1B4					Linearization 5	
		Breakpoint A5	21B5	A1B5					Linearization 5	
		Breakpoint A6	21B6	A1B6					Linearization 5	
		Breakpoint A7	21B7	A1B7					Linearization 5	
		Breakpoint A8	21B8	A1B8					Linearization 5	
		Breakpoint A9	21B9	A1B9					Linearization 5	
		Breakpoint A10	21BA	A1BA					Linearization 5	
		Breakpoint A11	21BB	A1BB					Linearization 5	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Linearization table	Linearization 5	Breakpoint A12	21BC	A1BC					Linearization 5	
		Breakpoint A13	21BD	A1BD					Linearization 5	
		Breakpoint A14	21BE	A1BE					Linearization 5	
		Breakpoint A15	21BF	A1BF					Linearization 5	
		Breakpoint A16	21C0	A1C0					Linearization 5	
		Breakpoint A17	21C1	A1C1					Linearization 5	
		Breakpoint A18	21C2	A1C2					Linearization 5	
		Breakpoint A19	21C3	A1C3					Linearization 5	
		Breakpoint A20	21C4	A1C4					Linearization 5	
		Breakpoint B1	21C5	A1C5					Linearization 5	
		Breakpoint B2	21C6	A1C6					Linearization 5	
		Breakpoint B3	21C7	A1C7					Linearization 5	
		Breakpoint B4	21C8	A1C8					Linearization 5	
		Breakpoint B5	21C9	A1C9					Linearization 5	
		Breakpoint B6	21CA	A1CA					Linearization 5	
		Breakpoint B7	21CB	A1CB					Linearization 5	
		Breakpoint B8	21CC	A1CC					Linearization 5	
		Breakpoint B9	21CD	A1CD					Linearization 5	
		Breakpoint B10	21CE	A1CE					Linearization 5	
		Breakpoint B11	21CF	A1CF					Linearization 5	
		Breakpoint B12	21D0	A1D0					Linearization 5	
		Breakpoint B13	21D1	A1D1					Linearization 5	
		Breakpoint B14	21D2	A1D2					Linearization 5	
		Breakpoint B15	21D3	A1D3					Linearization 5	
		Breakpoint B16	21D4	A1D4					Linearization 5	
		Breakpoint B17	21D5	A1D5					Linearization 5	
		Breakpoint B18	21D6	A1D6					Linearization 5	
		Breakpoint B19	21D7	A1D7					Linearization 5	
		Breakpoint B20	21D8	A1D8					Linearization 5	
	Linearization 6	Breakpoint decimal point position	21E0	A1E0					–	
		Breakpoint A1	21E1	A1E1					Linearization 6	
		Breakpoint A2	21E2	A1E2					Linearization 6	
		Breakpoint A3	21E3	A1E3					Linearization 6	
		Breakpoint A4	21E4	A1E4					Linearization 6	
		Breakpoint A5	21E5	A1E5					Linearization 6	
		Breakpoint A6	21E6	A1E6					Linearization 6	
		Breakpoint A7	21E7	A1E7					Linearization 6	
		Breakpoint A8	21E8	A1E8					Linearization 6	
		Breakpoint A9	21E9	A1E9					Linearization 6	
		Breakpoint A10	21EA	A1EA					Linearization 6	
		Breakpoint A11	21EB	A1EB					Linearization 6	
		Breakpoint A12	21EC	A1EC					Linearization 6	
		Breakpoint A13	21ED	A1ED					Linearization 6	
		Breakpoint A14	21EE	A1EE					Linearization 6	
		Breakpoint A15	21EF	A1EF					Linearization 6	
		Breakpoint A16	21F0	A1F0					Linearization 6	
		Breakpoint A17	21F1	A1F1					Linearization 6	
		Breakpoint A18	21F2	A1F2					Linearization 6	
		Breakpoint A19	21F3	A1F3					Linearization 6	
		Breakpoint A20	21F4	A1F4					Linearization 6	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Linearization table	Linearization 6	Breakpoint B1	21F5	A1F5					Linearization 6	
		Breakpoint B2	21F6	A1F6					Linearization 6	
		Breakpoint B3	21F7	A1F7					Linearization 6	
		Breakpoint B4	21F8	A1F8					Linearization 6	
		Breakpoint B5	21F9	A1F9					Linearization 6	
		Breakpoint B6	21FA	A1FA					Linearization 6	
		Breakpoint B7	21FB	A1FB					Linearization 6	
		Breakpoint B8	21FC	A1FC					Linearization 6	
		Breakpoint B9	21FD	A1FD					Linearization 6	
		Breakpoint B10	21FE	A1FE					Linearization 6	
		Breakpoint B11	21FF	A1FF					Linearization 6	
		Breakpoint B12	2200	A200					Linearization 6	
		Breakpoint B13	2201	A201					Linearization 6	
		Breakpoint B14	2202	A202					Linearization 6	
		Breakpoint B15	2203	A203					Linearization 6	
		Breakpoint B16	2204	A204					Linearization 6	
		Breakpoint B17	2205	A205					Linearization 6	
		Breakpoint B18	2206	A206					Linearization 6	
		Breakpoint B19	2207	A207					Linearization 6	
		Breakpoint B20	2208	A208					Linearization 6	
	Linearization 7	Breakpoint decimal point position	2210	A210					–	
		Breakpoint A1	2211	A211					Linearization 7	
		Breakpoint A2	2212	A212					Linearization 7	
		Breakpoint A3	2213	A213					Linearization 7	
		Breakpoint A4	2214	A214					Linearization 7	
		Breakpoint A5	2215	A215					Linearization 7	
		Breakpoint A6	2216	A216					Linearization 7	
		Breakpoint A7	2217	A217					Linearization 7	
		Breakpoint A8	2218	A218					Linearization 7	
		Breakpoint A9	2219	A219					Linearization 7	
		Breakpoint A10	221A	A21A					Linearization 7	
		Breakpoint A11	221B	A21B					Linearization 7	
		Breakpoint A12	221C	A21C					Linearization 7	
		Breakpoint A13	221D	A21D					Linearization 7	
		Breakpoint A14	221E	A21E					Linearization 7	
		Breakpoint A15	221F	A21F					Linearization 7	
		Breakpoint A16	2220	A220					Linearization 7	
		Breakpoint A17	2221	A221					Linearization 7	
		Breakpoint A18	2222	A222					Linearization 7	
		Breakpoint A19	2223	A223					Linearization 7	
		Breakpoint A20	2224	A224					Linearization 7	
		Breakpoint B1	2225	A225					Linearization 7	
		Breakpoint B2	2226	A226					Linearization 7	
		Breakpoint B3	2227	A227					Linearization 7	
		Breakpoint B4	2228	A228					Linearization 7	
		Breakpoint B5	2229	A229					Linearization 7	
		Breakpoint B6	222A	A22A					Linearization 7	
		Breakpoint B7	222B	A22B					Linearization 7	
		Breakpoint B8	222C	A22C					Linearization 7	
		Breakpoint B9	222D	A22D					Linearization 7	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Linearization table	Linearization 7	Breakpoint B10	222E	A22E					Linearization 7	
		Breakpoint B11	222F	A22F					Linearization 7	
		Breakpoint B12	2230	A230					Linearization 7	
		Breakpoint B13	2231	A231					Linearization 7	
		Breakpoint B14	2232	A232					Linearization 7	
		Breakpoint B15	2233	A233					Linearization 7	
		Breakpoint B16	2234	A234					Linearization 7	
		Breakpoint B17	2235	A235					Linearization 7	
		Breakpoint B18	2236	A236					Linearization 7	
		Breakpoint B19	2237	A237					Linearization 7	
		Breakpoint B20	2238	A238					Linearization 7	
	Linearization 8	Breakpoint decimal point position	2240	A240					–	
		Breakpoint A1	2241	A241					Linearization 8	
		Breakpoint A2	2242	A242					Linearization 8	
		Breakpoint A3	2243	A243					Linearization 8	
		Breakpoint A4	2244	A244					Linearization 8	
		Breakpoint A5	2245	A245					Linearization 8	
		Breakpoint A6	2246	A246					Linearization 8	
		Breakpoint A7	2247	A247					Linearization 8	
		Breakpoint A8	2248	A248					Linearization 8	
		Breakpoint A9	2249	A249					Linearization 8	
		Breakpoint A10	224A	A24A					Linearization 8	
		Breakpoint A11	224B	A24B					Linearization 8	
		Breakpoint A12	224C	A24C					Linearization 8	
		Breakpoint A13	224D	A24D					Linearization 8	
		Breakpoint A14	224E	A24E					Linearization 8	
		Breakpoint A15	224F	A24F					Linearization 8	
		Breakpoint A16	2250	A250					Linearization 8	
		Breakpoint A17	2251	A251					Linearization 8	
		Breakpoint A18	2252	A252					Linearization 8	
		Breakpoint A19	2253	A253					Linearization 8	
		Breakpoint A20	2254	A254					Linearization 8	
		Breakpoint B1	2255	A255					Linearization 8	
		Breakpoint B2	2256	A256					Linearization 8	
		Breakpoint B3	2257	A257					Linearization 8	
		Breakpoint B4	2258	A258					Linearization 8	
		Breakpoint B5	2259	A259					Linearization 8	
		Breakpoint B6	225A	A25A					Linearization 8	
		Breakpoint B7	225B	A25B					Linearization 8	
		Breakpoint B8	225C	A25C					Linearization 8	
		Breakpoint B9	225D	A25D					Linearization 8	
		Breakpoint B10	225E	A25E					Linearization 8	
		Breakpoint B11	225F	A25F					Linearization 8	
		Breakpoint B12	2260	A260					Linearization 8	
		Breakpoint B13	2261	A261					Linearization 8	
		Breakpoint B14	2262	A262					Linearization 8	
		Breakpoint B15	2263	A263					Linearization 8	
		Breakpoint B16	2264	A264					Linearization 8	
		Breakpoint B17	2265	A265					Linearization 8	
		Breakpoint B18	2266	A266					Linearization 8	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Linearization table	Linearization 8	Breakpoint B19	2267	A267					Linearization 8	
		Breakpoint B20	2268	A268					Linearization 8	
Setup		Use of recipe	2271	A271					–	
		SP system group	2272	A272					–	
		Sampling cycle	2273	A273					–	
		Start delay at power ON	2274	A274					–	
		Loop type	22B0	A2B0					–	
		PC backup type	22B1	A2B1					–	
		Release all latches	22B2	A2B2					–	
		Display brightness	22C0	A2C0					–	
Priority	Loop 1	SP group selection	22D0	A2D0					–	
		PID group selection	22D1	A2D1					–	
		RUN/READY mode selection	22D2	A2D2					–	
		AUTO/MANUAL mode selection	22D3	A2D3					–	
		LSP/RSP mode selection	22D4	A2D4					–	
		Backup/through output selection	22D5	A2D5					–	
	Loop 2	SP group selection	22E0	A2E0					–	
		PID group selection	22E1	A2E1					–	
		RUN/READY mode selection	22E2	A2E2					–	
		AUTO/MANUAL mode selection	22E3	A2E3					–	
		LSP/RSP mode selection	22E4	A2E4					–	
		Backup/through output selection	22E5	A2E5					–	Invalid setting
		Release all latches	2310	A310					–	
		OUT Linearization table use group	2311	A311					–	
PV	PV1	Range type	2340	A340					–	
		Decimal point position	2341	A341					–	
		Temperature unit	2342	A342					–	
		Range low limit	2343	A343					PV1	
		Range high limit	2344	A344					PV1	
		Cold junction compensation	2345	A345					–	
		Zener barrier adjustment	2346	A346					2	
		(Reserved for future use.)	2347	A347	×	×	×	×	–	
		Linear scaling low limit	2348	A348					PV1	
		Linear scaling high limit	2349	A349					PV1	
		Square root extraction dropout	234A	A34A					1	
		Filter	234B	A34B					2	
		Bias	234C	A34C					PV1	
		Ratio	234D	A34D					3	
		(Reserved for future use.)	234E	A34E	×	×	×	×	–	
		Thermocouple·mV input burnout	234F	A34F					–	
		(Reserved for future use.)	2350	A350	×	×	×	×	–	
		(Reserved for future use.)	2351	A351	×	×	×	×	–	
		(Reserved for future use.)	2352	A352	×	×	×	×	–	
		Linearization table group definition	2353	A353					–	
	PV2	Range type	2360	A360					–	
		Decimal point position	2361	A361					–	
		Temperature unit	2362	A362					–	
		Range low limit	2363	A363					PV2	
		Range high limit	2364	A364					PV2	
		Cold junction compensation	2365	A365					–	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
PV	PV2	Zener barrier adjustment	2366	A366					2	
		(Reserved for future use.)	2367	A367	×	×	×	×	–	
		Linear scaling low limit	2368	A368					PV2	
		Linear scaling high limit	2369	A369					PV2	
		Square root extraction dropout	236A	A36A					1	
		Filter	236B	A36B					2	
		Bias	236C	A36C					PV2	
		Ratio	236D	A36D					3	
		(Reserved for future use.)	236E	A36E	×	×	×	×	–	
		Thermocouple·mV input burnout	236F	A36F					–	
		(Reserved for future use.)	2370	A370	×	×	×	×	–	
		(Reserved for future use.)	2371	A371	×	×	×	×	–	
		(Reserved for future use.)	2372	A372	×	×	×	×	–	
		Linearization table group definition	2373	A373					–	
Output (continuous output)	OUT3	Output range	2420	A420					–	
		Output type	2421	A421					–	
		Loop/channel definition	2422	A422					–	
		Output decimal point position	2423	A423					–	
		Output scaling low limit	2424	A424					OUT3	
		Output scaling high limit	2425	A425					OUT3	
		Linearization table group definition	2426	A426					–	
	OUT4	Output range	2430	A430					–	
		Output type	2431	A431					–	
		Loop/channel definition	2432	A432					–	
		Output decimal point position	2433	A433					–	
		Output scaling low limit	2434	A434					OUT4	
		Output scaling high limit	2435	A435					OUT4	
		Linearization table group definition	2436	A436					–	
	OUT5	Output range	2440	A440					–	
		Output type	2441	A441					–	
		Loop/channel definition	2442	A442					–	
		Output decimal point position	2443	A443					–	
		Output scaling low limit	2444	A444					OUT5	
		Output scaling high limit	2445	A445					OUT5	
		Linearization table group definition	2446	A446					–	
	OUT6	Output range	2450	A450					–	
		Output type	2451	A451					–	
		Loop/channel definition	2452	A452					–	
		Output decimal point position	2453	A453					–	
		Output scaling low limit	2454	A454					OUT6	
		Output scaling high limit	2455	A455					OUT6	
		Linearization table group definition	2456	A456					–	
	OUT7	Output range	2460	A460					–	
		Output type	2461	A461					–	
		Loop/channel definition	2462	A462					–	
		Output decimal point position	2463	A463					–	
		Output scaling low limit	2464	A464					OUT7	
		Output scaling high limit	2465	A465					OUT7	
		Linearization table group definition	2466	A466					–	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Output (ON/OFF output)	OUT1	Output type	2470	A470					–	
		Latch	2471	A471					–	
		Time proportional cycle mode	2472	A472					–	
		Minimum ON/OFF time	2473	A473					–	
		Time proportional cycle	2474	A474					1	
		Linearization table group definition	2475	A475					–	
		(Reserved for future use.)	2476	A476	×	×	×	×	–	
	OUT2	Output type	2480	A480					–	
		Latch	2481	A481					–	
		Time proportional cycle mode	2482	A482					–	
		Minimum ON/OFF time	2483	A483					–	
		Time proportional cycle	2484	A484					1	
		Linearization table group definition	2485	A485					–	
		(Reserved for future use.)	2486	A486	×	×	×	×	–	
	OUT3	Output type	2490	A490					–	
		Latch	2491	A491					–	
		Time proportional cycle mode	2492	A492					–	
		Minimum ON/OFF time	2493	A493					–	
		Time proportional cycle	2494	A494					1	
		Linearization table group definition	2495	A495					–	
		(Reserved for future use.)	2496	A496	×	×	×	×	–	
	OUT4	Output type	24A0	A4A0					–	
		Latch	24A1	A4A1					–	
		Time proportional cycle mode	24A2	A4A2					–	
		Minimum ON/OFF time	24A3	A4A3					–	
		Time proportional cycle	24A4	A4A4					1	
		Linearization table group definition	24A5	A4A5					–	
		(Reserved for future use.)	24A6	A4A6	×	×	×	×	–	
	OUT5	Output type	24B0	A4B0					–	
		Latch	24B1	A4B1					–	
		Time proportional cycle mode	24B2	A4B2					–	
		Minimum ON/OFF time	24B3	A4B3					–	
		Time proportional cycle	24B4	A4B4					1	
		Linearization table group definition	24B5	A4B5					–	
		(Reserved for future use.)	24B6	A4B6	×	×	×	×	–	
Internal contact input	Contact 1	Operation type	2500	A500					–	
		Input type	2501	A501					–	
		Loop/channel definition	2502	A502					–	
		Weight	2503	A503					–	
	Contact 2	Operation type	2508	A508					–	
		Input type	2509	A509					–	
		Loop/channel definition	250A	A50A					–	
		Weight	250B	A50B					–	
	Contact 3	Operation type	2510	A510					–	
		Input type	2511	A511					–	
		Loop/channel definition	2512	A512					–	
		Weight	2513	A513					–	
	Contact 4	Operation type	2518	A518					–	
		Input type	2519	A519					–	
		Loop/channel definition	251A	A51A					–	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Internal contact input	Contact 4	Weight	251B	A51B					–	
	Contact 5	Operation type	2520	A520					–	
		Input type	2521	A521					–	
		Loop/channel definition	2522	A522					–	
		Weight	2523	A523					–	
	Contact 6	Operation type	2528	A528					–	
		Input type	2529	A529					–	
		Loop/channel definition	252A	A52A					–	
		Weight	252B	A52B					–	
	Contact 7	Operation type	2530	A530					–	
		Input type	2531	A531					–	
		Loop/channel definition	2532	A532					–	
		Weight	2533	A533					–	
	Contact 8	Operation type	2538	A538					–	
		Input type	2539	A539					–	
		Loop/channel definition	253A	A53A					–	
		Weight	253B	A53B					–	
	Contact 9	Operation type	2540	A540					–	
		Input type	2541	A541					–	
		Loop/channel definition	2542	A542					–	
		Weight	2543	A543					–	
	Contact 10	Operation type	2548	A548					–	
		Input type	2549	A549					–	
		Loop/channel definition	254A	A54A					–	
		Weight	254B	A54B					–	
	Contact 11	Operation type	2550	A550					–	
		Input type	2551	A551					–	
		Loop/channel definition	2552	A552					–	
		Weight	2553	A553					–	
	Contact 12	Operation type	2558	A558					–	
		Input type	2559	A559					–	
		Loop/channel definition	255A	A55A					–	
		Weight	255B	A55B					–	
	Contact 13	Operation type	2560	A560					–	
		Input type	2561	A561					–	
		Loop/channel definition	2562	A562					–	
		Weight	2563	A563					–	
	Contact 14	Operation type	2568	A568					–	
		Input type	2569	A569					–	
		Loop/channel definition	256A	A56A					–	
		Weight	256B	A56B					–	
	Contact 15	Operation type	2570	A570					–	
		Input type	2571	A571					–	
		Loop/channel definition	2572	A572					–	
		Weight	2573	A573					–	
	Contact 16	Operation type	2578	A578					–	
		Input type	2579	A579					–	
		Loop/channel definition	257A	A57A					–	
		Weight	257B	A57B					–	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Internal contact input	Contact 17	Operation type	2580	A580					–	
		Input type	2581	A581					–	
		Loop/channel definition	2582	A582					–	
		Weight	2583	A583					–	
	Contact 18	Operation type	2588	A588					–	
		Input type	2589	A589					–	
		Loop/channel definition	258A	A58A					–	
		Weight	258B	A58B					–	
	Contact 19	Operation type	2590	A590					–	
		Input type	2591	A591					–	
		Loop/channel definition	2592	A592					–	
		Weight	2593	A593					–	
	Contact 20	Operation type	2598	A598					–	
		Input type	2599	A599					–	
		Loop/channel definition	259A	A59A					–	
		Weight	259B	A59B					–	
Digital output	DO-C1	Output type	25A0	A5A0					–	
		Latch	25A1	A5A1					–	
	DO-C2	Output type	25A8	A5A8					–	
		Latch	25A9	A5A9					–	
	DO-C3	Output type	25B0	A5B0					–	
		Latch	25B1	A5B1					–	
	DO-C4	Output type	25B8	A5B8					–	
		Latch	25B9	A5B9					–	
	DO-C5	Output type	25C0	A5C0					–	
		Latch	25C1	A5C1					–	
	DO-C6	Output type	25C8	A5C8					–	
		Latch	25C9	A5C9					–	
	DO-C7	Output type	25D0	A5D0					–	
		Latch	25D1	A5D1					–	
	DO-C8	Output type	25D8	A5D8					–	
		Latch	25D9	A5D9					–	
	DO-E1	Output type	2620	A620					–	
		Latch	2621	A621					–	
	DO-E2	Output type	2628	A628					–	
		Latch	2629	A629					–	
	DO-E3	Output type	2630	A630					–	
		Latch	2631	A631					–	
	DO-E4	Output type	2638	A638					–	
		Latch	2639	A639					–	
	DO-E5	Output type	2640	A640					–	
		Latch	2641	A641					–	
	DO-E6	Output type	2648	A648					–	
		Latch	2649	A649					–	
	DO-E7	Output type	2650	A650					–	
		Latch	2651	A651					–	
	DO-E8	Output type	2658	A658					–	
		Latch	2659	A659					–	
Logical operation	Operation 1	Operation type	2660	A660					–	
		Input assignment A	2661	A661					–	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Logical operation	Operation 1	Input assignment B	2662	A662					–	
		Input assignment C	2663	A663					–	
		Input assignment D	2664	A664					–	
		Input bit polarity A	2665	A665					–	
		Input bit polarity B	2666	A666					–	
		Input bit polarity C	2667	A667					–	
		Input bit polarity D	2668	A668					–	
		ON delay time	2669	A669					1	
		OFF delay time	266A	A66A					1	
		Polarity	266B	A66B					–	
		Latch	266C	A66C					–	
	Operation 2	Operation type	2670	A670					–	
		Input assignment A	2671	A671					–	
		Input assignment B	2672	A672					–	
		Input assignment C	2673	A673					–	
		Input assignment D	2674	A674					–	
		Input bit polarity A	2675	A675					–	
		Input bit polarity B	2676	A676					–	
		Input bit polarity C	2677	A677					–	
		Input bit polarity D	2678	A678					–	
		ON delay time	2679	A679					1	
		OFF delay time	267A	A67A					1	
		Polarity	267B	A67B					–	
		Latch	267C	A67C					–	
	Operation 3	Operation type	2680	A680					–	
		Input assignment A	2681	A681					–	
		Input assignment B	2682	A682					–	
		Input assignment C	2683	A683					–	
		Input assignment D	2684	A684					–	
		Input bit polarity A	2685	A685					–	
		Input bit polarity B	2686	A686					–	
		Input bit polarity C	2687	A687					–	
		Input bit polarity D	2688	A688					–	
		ON delay time	2689	A689					1	
		OFF delay time	268A	A68A					1	
		Polarity	268B	A68B					–	
		Latch	268C	A68C					–	
	Operation 4	Operation type	2690	A690					–	
		Input assignment A	2691	A691					–	
		Input assignment B	2692	A692					–	
		Input assignment C	2693	A693					–	
		Input assignment D	2694	A694					–	
		Input bit polarity A	2695	A695					–	
		Input bit polarity B	2696	A696					–	
		Input bit polarity C	2697	A697					–	
		Input bit polarity D	2698	A698					–	
		ON delay time	2699	A699					1	
		OFF delay time	269A	A69A					1	
		Polarity	269B	A69B					–	
		Latch	269C	A69C					–	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Logical operation	Operation 5	Operation type	26A0	A6A0					–	
		Input assignment A	26A1	A6A1					–	
		Input assignment B	26A2	A6A2					–	
		Input assignment C	26A3	A6A3					–	
		Input assignment D	26A4	A6A4					–	
		Input bit polarity A	26A5	A6A5					–	
		Input bit polarity B	26A6	A6A6					–	
		Input bit polarity C	26A7	A6A7					–	
		Input bit polarity D	26A8	A6A8					–	
		ON delay time	26A9	A6A9					1	
		OFF delay time	26AA	A6AA					1	
		Polarity	26AB	A6AB					–	
		Latch	26AC	A6AC					–	
	Operation 6	Operation type	26B0	A6B0					–	
		Input assignment A	26B1	A6B1					–	
		Input assignment B	26B2	A6B2					–	
		Input assignment C	26B3	A6B3					–	
		Input assignment D	26B4	A6B4					–	
		Input bit polarity A	26B5	A6B5					–	
		Input bit polarity B	26B6	A6B6					–	
		Input bit polarity C	26B7	A6B7					–	
		Input bit polarity D	26B8	A6B8					–	
		ON delay time	26B9	A6B9					1	
		OFF delay time	26BA	A6BA					1	
		Polarity	26BB	A6BB					–	
		Latch	26BC	A6BC					–	
	Operation 7	Operation type	26C0	A6C0					–	
		Input assignment A	26C1	A6C1					–	
		Input assignment B	26C2	A6C2					–	
		Input assignment C	26C3	A6C3					–	
		Input assignment D	26C4	A6C4					–	
		Input bit polarity A	26C5	A6C5					–	
		Input bit polarity B	26C6	A6C6					–	
		Input bit polarity C	26C7	A6C7					–	
		Input bit polarity D	26C8	A6C8					–	
		ON delay time	26C9	A6C9					1	
		OFF delay time	26CA	A6CA					1	
		Polarity	26CB	A6CB					–	
		Latch	26CC	A6CC					–	
	Operation 8	Operation type	26D0	A6D0					–	
		Input assignment A	26D1	A6D1					–	
		Input assignment B	26D2	A6D2					–	
		Input assignment C	26D3	A6D3					–	
		Input assignment D	26D4	A6D4					–	
		Input bit polarity A	26D5	A6D5					–	
		Input bit polarity B	26D6	A6D6					–	
		Input bit polarity C	26D7	A6D7					–	
		Input bit polarity D	26D8	A6D8					–	
		ON delay time	26D9	A6D9					1	
		OFF delay time	26DA	A6DA					1	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Logical operation	Operation 8	Polarity	26DB	A6DB					–	
		Latch	26DC	A6DC					–	
	Operation 9	Operation type	26E0	A6E0					–	
		Input assignment A	26E1	A6E1					–	
		Input assignment B	26E2	A6E2					–	
		Input assignment C	26E3	A6E3					–	
		Input assignment D	26E4	A6E4					–	
		Input bit polarity A	26E5	A6E5					–	
		Input bit polarity B	26E6	A6E6					–	
		Input bit polarity C	26E7	A6E7					–	
		Input bit polarity D	26E8	A6E8					–	
		ON delay time	26E9	A6E9					1	
		OFF delay time	26EA	A6EA					1	
		Polarity	26EB	A6EB					–	
		Latch	26EC	A6EC					–	
	Operation 10	Operation type	26F0	A6F0					–	
		Input assignment A	26F1	A6F1					–	
		Input assignment B	26F2	A6F2					–	
		Input assignment C	26F3	A6F3					–	
		Input assignment D	26F4	A6F4					–	
		Input bit polarity A	26F5	A6F5					–	
		Input bit polarity B	26F6	A6F6					–	
		Input bit polarity C	26F7	A6F7					–	
		Input bit polarity D	26F8	A6F8					–	
		ON delay time	26F9	A6F9					1	
		OFF delay time	26FA	A6FA					1	
		Polarity	26FB	A6FB					–	
		Latch	26FC	A6FC					–	
	Operation 11	Operation type	2700	A700					–	
		Input assignment A	2701	A701					–	
		Input assignment B	2702	A702					–	
		Input assignment C	2703	A703					–	
		Input assignment D	2704	A704					–	
		Input bit polarity A	2705	A705					–	
		Input bit polarity B	2706	A706					–	
		Input bit polarity C	2707	A707					–	
		Input bit polarity D	2708	A708					–	
		ON delay time	2709	A709					1	
		OFF delay time	270A	A70A					1	
		Polarity	270B	A70B					–	
		Latch	270C	A70C					–	
	Operation 12	Operation type	2710	A710					–	
		Input assignment A	2711	A711					–	
		Input assignment B	2712	A712					–	
		Input assignment C	2713	A713					–	
		Input assignment D	2714	A714					–	
		Input bit polarity A	2715	A715					–	
		Input bit polarity B	2716	A716					–	
		Input bit polarity C	2717	A717					–	
		Input bit polarity D	2718	A718					–	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Logical operation	Operation 12	ON delay time	2719	A719					1	
		OFF delay time	271A	A71A					1	
		Polarity	271B	A71B					–	
		Latch	271C	A71C					–	
	Operation 13	Operation type	2720	A720					–	
		Input assignment A	2721	A721					–	
		Input assignment B	2722	A722					–	
		Input assignment C	2723	A723					–	
		Input assignment D	2724	A724					–	
		Input bit polarity A	2725	A725					–	
		Input bit polarity B	2726	A726					–	
		Input bit polarity C	2727	A727					–	
		Input bit polarity D	2728	A728					–	
		ON delay time	2729	A729					1	
		OFF delay time	272A	A72A					1	
		Polarity	272B	A72B					–	
		Latch	272C	A72C					–	
	Operation 14	Operation type	2730	A730					–	
		Input assignment A	2731	A731					–	
		Input assignment B	2732	A732					–	
		Input assignment C	2733	A733					–	
		Input assignment D	2734	A734					–	
		Input bit polarity A	2735	A735					–	
		Input bit polarity B	2736	A736					–	
		Input bit polarity C	2737	A737					–	
		Input bit polarity D	2738	A738					–	
		ON delay time	2739	A739					1	
		OFF delay time	273A	A73A					1	
		Polarity	273B	A73B					–	
		Latch	273C	A73C					–	
	Operation 15	Operation type	2740	A740					–	
		Input assignment A	2741	A741					–	
		Input assignment B	2742	A742					–	
		Input assignment C	2743	A743					–	
		Input assignment D	2744	A744					–	
		Input bit polarity A	2745	A745					–	
		Input bit polarity B	2746	A746					–	
		Input bit polarity C	2747	A747					–	
		Input bit polarity D	2748	A748					–	
		ON delay time	2749	A749					1	
		OFF delay time	274A	A74A					1	
		Polarity	274B	A74B					–	
		Latch	274C	A74C					–	
	Operation 16	Operation type	2750	A750					–	
		Input assignment A	2751	A751					–	
		Input assignment B	2752	A752					–	
		Input assignment C	2753	A753					–	
		Input assignment D	2754	A754					–	
		Input bit polarity A	2755	A755					–	
		Input bit polarity B	2756	A756					–	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Logical operation	Operation 16	Input bit polarity C	2757	A757					–	
		Input bit polarity D	2758	A758					–	
		ON delay time	2759	A759					1	
		OFF delay time	275A	A75A					1	
		Polarity	275B	A75B					–	
		Latch	275C	A75C					–	
User-defined bit		User-defined bits 1-8	2760	A760					–	
		User-defined bits 1	2761	A761					–	
		User-defined bits 2	2762	A762					–	
		User-defined bits 3	2763	A763					–	
		User-defined bits 4	2764	A764					–	
		User-defined bits 5	2765	A765					–	
		User-defined bits 6	2766	A766					–	
		User-defined bits 7	2767	A767					–	
		User-defined bits 8	2768	A768					–	
Display/key	Top priority	MS display, condition	2780	A780					–	
		MS display, status	2781	A781					–	
		MS display, decimal point position	2782	A782					–	
		MS display, scaling low limit	2783	A783					MS1	
		MS display, scaling high limit	2784	A784					MS1	
	Second priority	MS display, condition	2790	A790					–	
		MS display, status	2791	A791					–	
		MS display, decimal point position	2792	A792					–	
		MS display, scaling low limit	2793	A793					MS2	
		MS display, scaling high limit	2794	A794					MS2	
	Third priority	MS display, condition	27A0	A7A0					–	
		MS display, status	27A1	A7A1					–	
		MS display, decimal point position	27A2	A7A2					–	
		MS display, scaling low limit	27A3	A7A3					MS3	
		MS display, scaling high limit	27A4	A7A4					MS3	
	rsp/lsp key	F key basic registration	27B0	A7B0					–	
		F key assignment item 1	27B1	A7B1					–	
		F key assignment item 2	27B2	A7B2					–	
		F key assignment item 3	27B3	A7B3					–	
		F key assignment item 4	27B4	A7B4					–	
		F key assignment item 5	27B5	A7B5					–	
		F key assignment item 6	27B6	A7B6					–	
		F key assignment item 7	27B7	A7B7					–	
		F key assignment item 8	27B8	A7B8					–	
	at key	F key basic registration	27C0	A7C0					–	
		F key assignment item 1	27C1	A7C1					–	
		F key assignment item 2	27C2	A7C2					–	
		F key assignment item 3	27C3	A7C3					–	
		F key assignment item 4	27C4	A7C4					–	
		F key assignment item 5	27C5	A7C5					–	
		F key assignment item 6	27C6	A7C6					–	
		F key assignment item 7	27C7	A7C7					–	
		F key assignment item 8	27C8	A7C8					–	
	f1 key	F key basic registration	27D0	A7D0					–	
		F key assignment item 1	27D1	A7D1					–	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Display/key	f1 key	F key assignment item 2	27D2	A7D2					–	
		F key assignment item 3	27D3	A7D3					–	
		F key assignment item 4	27D4	A7D4					–	
		F key assignment item 5	27D5	A7D5					–	
		F key assignment item 6	27D6	A7D6					–	
		F key assignment item 7	27D7	A7D7					–	
		F key assignment item 8	27D8	A7D8					–	
	f2 key	F key basic registration	27E0	A7E0					–	
		F key assignment item 1	27E1	A7E1					–	
		F key assignment item 2	27E2	A7E2					–	
		F key assignment item 3	27E3	A7E3					–	
		F key assignment item 4	27E4	A7E4					–	
		F key assignment item 5	27E5	A7E5					–	
		F key assignment item 6	27E6	A7E6					–	
		F key assignment item 7	27E7	A7E7					–	
		F key assignment item 8	20E8	A7E8					–	
	UF1 LED	UF LED, condition	27F0	A7F0					–	
		UF LED, status	27F1	A7F1					–	
	UF2 LED	UF LED, condition	27F4	A7F4					–	
		UF LED, status	27F5	A7F5					–	
	UF3 LED	UF LED, condition	27F8	A7F8					–	
		UF LED, status	27F9	A7F9					–	
	UF4 LED	UF LED, condition	27FC	A7FC					–	
		UF LED, status	27FD	A7FD					–	
Communications		(Reserved for future use.)	2800	A800	×	×	×	×	–	
		Machine address	2801	A801		×		×	–	
		Transmission speed	2802	A802		×		×	–	
		Data format (Data length)	2803	A803		×		×	–	
		Data format (Parity)	2804	A804		×		×	–	
		Data format (Stop bit)	2805	A805		×		×	–	
		Response time-out	2806	A806		×		×	–	
Lock		Key lock (Setting change)	2810	A810		×		×	–	
		Key lock (Display)	2811	A811		×		×	–	
		RS-485 communication lock (Read)	2812	A812		×		×	–	
		RS-485 communication lock (Write)	2813	A813		×		×	–	
		Loader communication lock (Read)	2814	A814		×		×	–	
		Loader communication lock (Write)	2815	A815		×		×	–	
Monitor		Alarm information 1	2830	A830		×		×	–	For details, see alarm information 1-4 in "Basic Monitor Bank" of another manual, List of Displays and Settings (on pages 2-29 and 2-31).
		Alarm information 2	2831	A831		×		×	–	
		Alarm information 3	2832	A832		×		×	–	
		Alarm information 4	2833	A833		×		×	–	
	Loop 1	PV	2840	A840		×		×	LP1	
		SP	2841	A841		×		×	LP1	
		MV	2842	A842		×		×	1	
		Heat MV	2843	A843		×		×	1	
		Cool MV	2844	A844		×		×	1	
		AT progress	2845	A845		×		×	–	
		SP group selection	2846	A846		×		×	–	
	Loop 2	PV	2850	A850		×		×	LP2	
		SP	2851	A851		×		×	LP2	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Monitor	Loop 2	MV	2852	A852		×		×	1	
		Heat MV	2853	A853		×		×	1	
		Cool MV	2854	A854		×		×	1	
		AT progress	2855	A855		×		×	–	
		SP group selection	2856	A856		×		×	–	
	PV1	PV value	2880	A880		×		×	PV1	
	PV2	PV value	2881	A881		×		×	PV2	
		(Reserved for future use.)	2890	A890		×		×	1	
		Power frequency	28C0	A8C0		×		×	–	
	OUT1	Output percent data	28D0	A8D0		×		×	1	
	OUT2	Output percent data	28D1	A8D1		×		×	1	
	OUT3	Output percent data	28D2	A8D2		×		×	1	
	OUT4	Output percent data	28D3	A8D3		×		×	1	
	OUT5	Output percent data	28D4	A8D4		×		×	1	
	OUT6	Output percent data	28D5	A8D5		×		×	1	
	OUT7	Output percent data	28D6	A8D6		×		×	1	
	OUT1	Output ON/OFF data	28E0	A8E0		×		×	–	
	OUT2	Output ON/OFF data	28E1	A8E1		×		×	–	
	OUT3	Output ON/OFF data	28E2	A8E2		×		×	–	
	OUT4	Output ON/OFF data	28E3	A8E3		×		×	–	
	OUT5	Output ON/OFF data	28E4	A8E4		×		×	–	
	OUT6	Output ON/OFF data	28E5	A8E5		×		×	–	
	OUT7	Output ON/OFF data	28E6	A8E6		×		×	–	
		DI-C1 to DI-C4	28F0	A8F0		×		×	–	For details, see digital input information 1-7 in "Basic Monitor Bank" of another manual, List of Displays and Settings (on pages 2-29 and 2-31).
		DI-C5 to DI-C8	28F1	A8F1		×		×	–	
		DI-D1 to DI-D4	28F2	A8F2		×		×	–	
		DI-D5 to DI-D8	28F3	A8F3		×		×	–	
		(Reserved for future use.)	28F4	A8F4		×		×	–	
		(Reserved for future use.)	28F5	A8F5		×		×	–	
		DI-F1 to DI-F2	28F6	A8F6		×		×	–	
		DO-C1 to DO-C4	2900	A900		×		×	–	For details, see digital output information 1-6 in "Basic Monitor Bank" of another manual, List of Displays and Settings (on pages 2-29 and 2-31).
		DO-C5 to DO-C8	2901	A901		×		×	–	
		(Reserved for future use.)	2902	A902		×		×	–	
		(Reserved for future use.)	2903	A903		×		×	–	
		DO-E1 to DO-E4	2904	A904		×		×	–	
		DO-E5 to DO-E8	2905	A905		×		×	–	
	EV1	Delay remaining time	2910	A910		×		×	1	
	EV2	Delay remaining time	2911	A911		×		×	1	
	EV3	Delay remaining time	2912	A912		×		×	1	
	EV4	Delay remaining time	2913	A913		×		×	1	
	EV5	Delay remaining time	2914	A914		×		×	1	
	EV3	Delay remaining time	2915	A915		×		×	1	
	EV7	Delay remaining time	2916	A916		×		×	1	
	EV8	Delay remaining time	2917	A917		×		×	1	
	EV9	Delay remaining time	2918	A918		×		×	1	
	EV10	Delay remaining time	2919	A919		×		×	1	
	EV11	Delay remaining time	291A	A91A		×		×	1	
	EV12	Delay remaining time	291B	A91B		×		×	1	
	EV13	Delay remaining time	291C	A91C		×		×	1	
	EV14	Delay remaining time	291D	A91D		×		×	1	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Monitor	EV15	Delay remaining time	291E	A91E		×		×	1	
	EV16	Delay remaining time	291F	A91F		×		×	1	
		Number of days continuously energized	2930	A930		×		×	–	Number of days (1: One day)
		Number of EEPROM writing cycles	2940	A940		×		×	–	1/100
SP configuration	Loop 1	RSP ratio 1	2A70	AA70					3	
		RSP ratio 2	2A71	AA71					3	
		RSP ratio 3	2A72	AA72					3	
		RSP ratio 4	2A73	AA73					3	
		RSP ratio 5	2A74	AA74					3	
		RSP ratio 6	2A75	AA75					3	
		RSP ratio 7	2A76	AA76					3	
		RSP ratio 8	2A77	AA77					3	
	Loop 2	RSP ratio 1	2A80	AA80					3	
		RSP ratio 2	2A81	AA81					3	
		RSP ratio 3	2A82	AA82					3	
		RSP ratio 4	2A83	AA83					3	
		RSP ratio 5	2A84	AA84					3	
		RSP ratio 6	2A85	AA85					3	
		RSP ratio 7	2A86	AA86					3	
		RSP ratio 8	2A87	AA87					3	
MV	Loop 1	Scaling system	2AD0	AAD0					–	
		Scaling low limit	2AD1	AAD1					LP1	
		Scaling high limit	2AD2	AAD2					LP1	
		Tracking mode	2AD3	AAD3					–	
		SP output filter	2AD4	AAD4					2	
	Loop 2	Scaling system	2AD8	AAD8					–	
		Scaling low limit	2AD9	AAD9					LP2	
		Scaling high limit	2ADA	AADA					LP2	
		Tracking mode	2ADB	AADB					–	
		SP output filter	2ADC	AADC					2	
Standard bit		OFF(0)	4500	C500		×		×	–	
		ON(1)	4501	C501		×		×	–	
		Event 1	4540	C540		×		×	–	
		Event 2	4541	C541		×		×	–	
		Event 3	4542	C542		×		×	–	
		Event 4	4543	C543		×		×	–	
		Event 5	4544	C544		×		×	–	
		Event 6	4545	C545		×		×	–	
		Event 7	4546	C546		×		×	–	
		Event 8	4547	C547		×		×	–	
		Event 9	4548	C548		×		×	–	
		Event 10	4549	C549		×		×	–	
		Event 11	454A	C54A		×		×	–	
		Event 12	454B	C54B		×		×	–	
		Event 13	454C	C54C		×		×	–	
		Event 14	454D	C54D		×		×	–	
		Event 15	454E	C54E		×		×	–	
		Event 16	454F	C54F		×		×	–	
		DI-C1 terminal status	4580	C580		×		×	–	
		DI-C2 terminal status	4581	C581		×		×	–	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Standard bit		DI-C3 terminal status	4582	C582		×		×	–	
		DI-C4 terminal status	4583	C583		×		×	–	
		DI-C5 terminal status	4584	C584		×		×	–	
		DI-C6 terminal status	4585	C585		×		×	–	
		DI-C7 terminal status	4586	C586		×		×	–	
		DI-C8 terminal status	4587	C587		×		×	–	
		DI-D1 terminal status	4588	C588		×		×	–	
		DI-D2 terminal status	4589	C589		×		×	–	
		DI-D3 terminal status	458A	C58A		×		×	–	
		DI-D4 terminal status	458B	C58B		×		×	–	
		DI-D5 terminal status	458C	C58C		×		×	–	
		DI-D6 terminal status	458D	C58D		×		×	–	
		DI-D7 terminal status	458E	C58E		×		×	–	
		DI-D8 terminal status	458F	C58F		×		×	–	
		DI-F1 terminal status	4598	C598		×		×	–	
		DI-F2 terminal status	4599	C599		×		×	–	
		DO-C1 terminal status	45C0	C5C0		×		×	–	
		DO-C2 terminal status	45C1	C5C1		×		×	–	
		DO-C3 terminal status	45C2	C5C2		×		×	–	
		DO-C4 terminal status	45C3	C5C3		×		×	–	
		DO-C5 terminal status	45C4	C5C4		×		×	–	
		DO-C6 terminal status	45C5	C5C5		×		×	–	
		DO-C7 terminal status	45C6	C5C6		×		×	–	
		DO-C8 terminal status	45C7	C5C7		×		×	–	
		DO-E1 terminal status	45D0	C5D0		×		×	–	
		DO-E2 terminal status	45D1	C5D1		×		×	–	
		DO-E3 terminal status	45D2	C5D2		×		×	–	
		DO-E4 terminal status	45D3	C5D3		×		×	–	
		DO-E5 terminal status	45D4	C5D4		×		×	–	
		DO-E6 terminal status	45D5	C5D5		×		×	–	
		DO-E7 terminal status	45D6	C5D6		×		×	–	
		DO-E8 terminal status	45D7	C5D7		×		×	–	
		OUT1 (ON/OFF status)	4600	C600		×		×	–	
		OUT2 (ON/OFF status)	4601	C601		×		×	–	
		OUT3 (ON/OFF status)	4602	C602		×		×	–	
		OUT4 (ON/OFF status)	4603	C603		×		×	–	
		OUT5 (ON/OFF status)	4604	C604		×		×	–	
		OUT6 (ON/OFF status)	4605	C605		×		×	–	
		OUT7 (ON/OFF status)	4606	C606		×		×	–	
		User-defined bit 1	4680	C680		×		×	–	
		User-defined bit 2	4681	C681		×		×	–	
		User-defined bit 3	4682	C682		×		×	–	
		User-defined bit 4	4683	C683		×		×	–	
		User-defined bit 5	4684	C684		×		×	–	
		User-defined bit 6	4685	C685		×		×	–	
		User-defined bit 7	4686	C686		×		×	–	
		User-defined bit 8	4687	C687		×		×	–	
		Results of logical operation 1	46A0	C6A0		×		×	–	
		Results of logical operation 2	46A1	C6A1		×		×	–	
		Results of logical operation 3	46A2	C6A2		×		×	–	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Standard bit		Results of logical operation 4	46A3	C6A3		×		×	–	
		Results of logical operation 5	46A4	C6A4		×		×	–	
		Results of logical operation 6	46A5	C6A5		×		×	–	
		Results of logical operation 7	46A6	C6A6		×		×	–	
		Results of logical operation 8	46A7	C6A7		×		×	–	
		Results of logical operation 9	46A8	C6A8		×		×	–	
		Results of logical operation 10	46A9	C6A9		×		×	–	
		Results of logical operation 11	46AA	C6AA		×		×	–	
		Results of logical operation 12	46AB	C6AB		×		×	–	
		Results of logical operation 13	46AC	C6AC		×		×	–	
		Results of logical operation 14	46AD	C6AD		×		×	–	
		Results of logical operation 15	46AE	C6AE		×		×	–	
		Results of logical operation 16	46AF	C6AF		×		×	–	
		Key status (auto/man)	46E0	C6E0		×		×	–	
		Key status (sp/ev)	46E1	C6E1		×		×	–	
		Key status (para)	46E2	C6E2		×		×	–	
		Key status (rsp/lsp)	46E3	C6E3		×		×	–	
		Key status (at)	46E4	C6E4		×		×	–	
		Key status (f1)	46E5	C6E5		×		×	–	
		Key status (f2)	46E6	C6E6		×		×	–	
		Key status (up)	46E7	C6E7		×		×	–	
		Key status (left)	46E8	C6E8		×		×	–	
		Key status (right)	46E9	C6E9		×		×	–	
		Key status (down)	46EA	C6EA		×		×	–	
		Key status (display)	46EB	C6EB		×		×	–	
		Key status (enter)	46EC	C6EC		×		×	–	
		Communications status (normal receipt on a byte basis)	4709	C709		×		×	–	
		(Reserved for future use.)	470A	C70A	×	×	×	×	–	
		Communications status (normal receipt on a byte basis)	470B	C70B		×		×	–	
		Communications status (an error received)	470C	C70C		×		×	–	
		RUN/READY status of loop 1	4720	C720		×		×	–	0:RUN
		RUN/READY status of loop 2	4721	C721		×		×	–	1:READY
		AUTO/MANUAL status of loop 1	4730	C730		×		×	–	0:AUTO
		AUTO/MANUAL status of loop 2	4731	C731		×		×	–	1:MANUAL
		AT stop/start status of loop 1	4740	C740		×		×	–	0:AT stop
		AT stop/start status of loop 2	4741	C741		×		×	–	1:AT start
		LSP/RSP status of loop 1	4750	C750		×		×	–	0:LSP
		LSP/RSP status of loop 2	4751	C751		×		×	–	1:RSP
		During SP ramp of loop 1 (up)	4770	C770		×		×	–	
		During SP ramp of loop 2 (up)	4771	C771		×		×	–	
		During SP ramp of loop 1 (down)	4780	C780						
		During SP ramp of loop 2 (down)	4781	C781						
		Backup/through output status of loop 1	47A0	C7A0		×		×	–	0:Backup 1:Through output status
		(Reserved for future use.)	47A1	C7A1	×	×	×	×	–	
		All typical alarms	4800	C800		×		×	–	OR of all the alarms to be displayed

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Standard bit		PV input high limit alarm (PV1)	4820	C820		×		×	–	
		PV input high limit alarm (PV2)	4821	C821		×		×	–	
		PV input low limit alarm (PV1)	4830	C830		×		×	–	
		PV input low limit alarm (PV2)	4831	C831		×		×	–	
		CJ input alarm (PV1)	4840	C840		×		×	–	
		CJ input alarm (PV2)	4841	C841		×		×	–	
		(Reserved for future use.)	4858	C858	×	×	×	×	–	
		(Reserved for future use.)	4860	C860	×	×	×	×	–	
		(Reserved for future use.)	4868	C868	×	×	×	×	–	
		(Reserved for future use.)	48A0	C8A0	×	×	×	×	–	
		(Reserved for future use.)	48A1	C8A1	×	×	×	×	–	
		Parameter failure	48B0	C8B0		×		×	–	
		Adjustment data failure (CPU board)	48B1	C8B1		×		×	–	
		Adjustment data failure (PV board)	48B2	C8B2		×		×	–	
		(Reserved for future use.)	48B3	C8B3	×	×	×	×	–	
		ROM failure (CPU board)	48B4	C8B40		×		×	–	
		ROM failure (PV board)	48B5	C8B50		×		×	–	
		(Reserved for future use.)	48B6	C8B6	×	×	×	×	–	
Standard value		PV1	4A00	CA00		×		×	PV1	
		PV2	4A01	CA01		×		×	PV2	
		PV of loop 1 (used for PID operation)	4A10	CA10		×		×	LP1	
		PV of loop 2 (used for PID operation)	4A11	CA11		×		×	LP2	
		SP of loop 1 (in use)	4A20	CA20		×		×	LP1	
		SP of loop 2 (in use)	4A21	CA21		×		×	LP2	
		SP of loop 1 (finally attained value)	4A30	CA30		×		×	LP1	
		SP of loop 2 (finally attained value)	4A31	CA31		×		×	LP2	
		SP output of loop 1	4A50	CA50		×		×	LP1	
		(Reserved for future use.)	4A51	CA51	△	×	△	×	LP2	
		MV of loop 1	4A70	CA70		×		×	1	
		MV of loop 2	4A71	CA71		×		×	1	
		MV of loop 1 (Heat)	4A80	CA80		×		×	1	
		MV of loop 2 (Heat)	4A81	CA81		×		×	1	
		MV of loop 1 (Cool)	4A90	CA90		×		×	1	
		MV of loop 2 (Cool)	4A91	CA91		×		×	1	
		(Reserved for future use.)	4AA0	CAA0	×	×	×	×	–	
		(Reserved for future use.)	4AB0	CAB0	×	×	×	×	–	
		(Reserved for future use.)	4AC0	CAC0	×	×	×	×	–	
		(Reserved for future use.)	4AC1	CAC1	×	×	×	×	–	
		(Reserved for future use.)	4AD0	CAD0	×	×	×	×	–	
		(Reserved for future use.)	4AD1	CAD1	×	×	×	×	–	
		Deviation of loop 1 (PV-SP)	4AE0	CAE0		×		×	LP1	
		Deviation of loop 2 (PV-SP)	4AE1	CAE1		×		×	LP2	
		Event 1 delay remaining time	4B60	CB60		×		×	1	
		Event 2 delay remaining time	4B61	CB61		×		×	1	
		Event 3 delay remaining time	4B62	CB62		×		×	1	
		Event 4 delay remaining time	4B63	CB63		×		×	1	
		Event 5 delay remaining time	4B64	CB64		×		×	1	
		Event 6 delay remaining time	4B65	CB65		×		×	1	
		Event 7 delay remaining time	4B66	CB66		×		×	1	
		Event 8 delay remaining time	4B67	CB67		×		×	1	

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Standard value		Event 9 delay remaining time	4B68	CB68		×		×	1	
		Event 10 delay remaining time	4B69	CB69		×		×	1	
		Event 11 delay remaining time	4B6A	CB6A		×		×	1	
		Event 12 delay remaining time	4B6B	CB6B		×		×	1	
		Event 13 delay remaining time	4B6C	CB6C		×		×	1	
		Event 14 delay remaining time	4B6D	CB6D		×		×	1	
		Event 15 delay remaining time	4B6E	CB6E		×		×	1	
		Event 16 delay remaining time	4B6F	CB6F		×		×	1	
		(Reserved for future use.)	4BA0	CBA0	×	×	×	×	–	
Communications profile (Instrument status)	Loop 1	RUN/READY	3810	B810		×		×	–	0:RUN 1:READY
		AUTO/MANUAL	3811	B811		×		×	–	0:AUTO 1:MANUAL
		AT stop/start	3812	B812		×		×	–	0:AT stop 1:AT start
		LSP/RSP	3813	B813		×		×	–	0:LSP 1:RSP
		PV	3814	B814		×		×	LP1	
		SP	3815	B815		×		×	LP1	
		MV	3816	B816		×		×	1	
		(Reserved for future use.)	3817	B817	△	×	△	×	–	
	Loop 2	RUN/READY	3818	B818		×		×	–	0:RUN 1:READY
		AUTO/MANUAL	3819	B819		×		×	–	0:AUTO 1:MANUAL
		AT stop/start	381A	B81A		×		×	–	0:AT stop 1:AT start
		LSP/RSP	381B	B81B		×		×	–	0:LSP 1:RSP
		PV	381C	B81C		×		×	LP2	
		SP	381D	B81D		×		×	LP2	
		MV	381E	B81E		×		×	1	
		(Reserved for future use.)	381F	B81F	△	×	△	×	–	
Communications profile (operation)	Loop 1	SP group selection	3900	B900					–	If internal contact input is given high priority, writing is invalid.
		LSP	3901	B901					LP1	
		Manual MV	3902	B902		□		□	1	
		RUN/READY	3903	B903		□		□	–	0:RUN 1:READY
		AUTO/MANUAL	3904	B904		□		□	–	0:AUTO 1:MANUAL
		AT stop/start	3905	B905		□		□	–	0:AT stop 1:AT start
		LSP/RSP	3906	B906		□		□	–	0:LSP 1:RSP
		(Reserved for future use.)	3907	B907	△	△	△	△	–	
	Loop 2	SP group selection	3908	B908					–	If internal contact input is given high priority, writing is invalid.
		LSP	3909	B909					LP2	
		Manual MV	390A	B90A		□		□	1	
		RUN/READY	390B	B90B		□		□	–	0:RUN 1:READY

Bank name	No.	Item name	RAM address	EEPROM address	RAM		EEPROM		Decimal point	Remarks
			Hexadecimal	Hexadecimal	Read	Write	Read	Write	information	
Communications profile (operation)	Loop 2	AUTO/MANUAL	390C	B90C		□		□	–	0:AUTO 1:MANUAL
		AT stop/start	390D	B90D		□		□	–	0:AT stop 1:AT start
		LSP/RSP	390E	B90E		□		□	–	0:LSP 1:RSP
		(Reserved for future use.)	390F	B90F	△	△	△	△	–	
Communications profile (PID group in use)	Loop 1	Proportional band	3A00	BA00					1	Set value for the PID group in use
		Integral time	3A01	BA01					PID1	
		Derivative time	3A02	BA02					PID1	
		Manual reset	3A03	BA03					1	
		Output low limit	3A04	BA04					1	
		Output high limit	3A05	BA05					1	
		Proportional band for cool side	3A06	BA06					1	
		Integration time for cool side	3A07	BA07					PID1	
		Derivative time for cool side	3A08	BA08					PID1	
		(Reserved for future use.)	3A09	BA09	△	△	△	△	1	
		Output low limit for cool side	3A0A	BA0A					1	
		Output high limit for cool side	3A0B	BA0B					1	
	Loop 2	Proportional band	3A0C	BA0C					1	Set value for the PID group in use
		Integral time	3A0D	BA0D					PID2	
		Derivative time	3A0E	BA0E					PID2	
		Manual reset	3A0F	BA0F					1	
		Output low limit	3A10	BA10					1	
		Output high limit	3A11	BA11					1	
		Proportional band for cool side	3A12	BA12					1	
		Integration time for cool side	3A13	BA13					PID2	
		Derivative time for cool side	3A14	BA14					PID2	
		(Reserved for future use.)	3A15	BA15	△	△	△	△	1	
		Output low limit for cool side	3A16	BA16					1	
		Output high limit for cool side	3A17	BA17					1	

Chapter 11. TROUBLESHOOTING

■ Alarm code displays and corrective actions

Alarm codes and countermeasures in case of abnormal operation of this controller.

Alarm code	Failure name	Cause	Corrective action
AL01	PV1 input failure (over-range)	Sensor burnout, incorrect wiring, incorrect PV1 range type setting.	Check the wiring or reset PV1 range type (Pv-01). Reset PV1 range high/low limits (Pv-04: Range low limit, Pv-05: Range high limit.)
AL02	PV1 input failure (under-range)		
AL03	PV2 input failure (over-range)	Sensor burnout, incorrect wiring, incorrect PV2 range type setting.	Check the wiring or reset PV2 range type (Pv-01). Reset PV2 range high/low limits (Pv-04: Range low limit, Pv-05: Range high limit.)
AL04	PV2 input failure (under-range)		
AL71	Abnormal PV1 CJ compensation	Abnormal terminal temperature (thermocouple).	Check the ambient temperature.
AL72	Abnormal PV2 CJ compensation		
AL83	Board configuration problem	Hardware failure.	Replace the unit.
AL97	Parameter failure	Power was turned OFF while setting data. Data is corrupted due to noise, etc.	Restart the system. Reset data (AL97: setting data, AL98: tuning data) or replace the unit.
AL98	Adjustment data problem		
AL99	ROM failure	ROM (memory) is faulty.	Restart the system. Replace the unit.

Chapter 12. MAINTENANCE, INSPECTION, AND DISPOSAL

12 - 1 Maintenance and Inspection

Cleaning: When removing dirt from the instrument, wipe it off with a soft cloth rag.

Part replacement: Do not replace any parts of this unit.

Fuse replacement: When replacing the fuse connected to the electric wiring, always use the specified standard fuse.
Standard IEC127
Shut-down speed Slow-action type (T)
Rated voltage 250V
Rated current 1.0A

12 - 2 Disposal

When disposing of this unit, dispose of it appropriately as an industrial waste in accordance with local laws and regulations.

Chapter 13. SPECIFICATIONS

● Analog input (PV)

Input type Thermocouple: K, E, J, T, B, R, S, N(JIS C 1602-1995)
WRe5-26(ASTM E988-96(Reapproved 2002))
PR40-20, Ni-Ni•Mo, PL II,
Gold-iron/chromel (ASTM E1751-00),
DIN U, DIN L(DIN 43710-1985)

Resistance temperature detector (RTD):
Pt100(JIS C 1604-1997)
JPt100(JIS C 1604-1989)

DC voltage (mV-range): 0 to 10 mV, -10 to +10 mV, 0 to 100 mV, -100 to +100 mV

DC voltage (V-range): 0 to 1 V, -1 to +1 V, 1 to 5 V, 0 to 5 V, 0 to 10 V

DC current: 4 to 20 mA, 0 to 20 mA

Sampling cycle: 25 ms, 50 ms, 100 ms, 300 ms
(determined by the sampling cycle setting.)

• Thermocouple input

Indication accuracy (under standard conditions):

Sensor type	Input indication accuracy	
K	±0.1 % rdg. ± 1 digit	400 °C or higher
	±0.5 °C	-100 to less than +400 °C
	±1.0 °C	-200 to less than -100 °C
	±20.0 °C	Less than -200 °C
J	±0.1 % rdg. ± 1 digit	400 °C or higher
	±0.5 °C	-100 to less than +400 °C
	±1.0 °C	Less than -100 °C
E	±0.1 % rdg. ± 1 digit	400 °C or higher
	±0.5 °C	-100 to less than +400 °C
	±1.0 °C	-200 to less than -100 °C
	±15.0 °C	Less than -200 °C
T	±0.5 °C	-100 °C or higher
	±1.0 °C	-200 to less than -100 °C
	±10.0 °C	Less than -200 °C
B	±2 °C	800 °C or higher
	±4 °C	260 to less than 800 °C
	±70 °C	Less than 260 °C
R	±0.1 % rdg. ± 1 digit	1000 °C or higher
	±2.0 °C	0 to less than 1000 °C
	±4.0 °C	Less than 0 °C
S	±0.1 % rdg. ± 1 digit	1000 °C or higher
	±2.0 °C	0 to less than 1000 °C
	±4.0 °C	Less than 0 °C
N	±1.4 °C	0 °C or higher
	±4.0 °C	Less than 0 °C
WRe5-26	±0.1 % rdg. ± 1 digit	1400 °C or higher
	±1.5 °C	Less than 1400 °C
PR40-20	±8 °C	800 °C or higher
	±20 °C	300 to less than 800 °C
	±40 °C	Less than 300 °C
Ni-Ni•Mo	±1.4 °C	
PL II	±1.4 °C	
DIN U	±0.7 °C	0 °C or higher
	±1.0 °C	Less than 0 °C
DIN L	±1.0 °C	0 °C or higher
	±1.5 °C	Less than 0 °C
Gold-iron/Chromel	±1.5 °C	

Internal cold junction compensation accuracy:
±0.5 °C (under standard conditions)
±1.0 °C Ambient temperature, 0 to 50 °C (under other standard conditions)

Cold junction compensation method: Internal/external (0 °C only) compensation selectable

Allowable input voltage: -1.0 V to +3.5 V

⚠ CAUTION: Do not apply a voltage exceeding the allowable input voltage.
Doing so might cause this unit to malfunction.

Input bias current: 0.2 µA (flowed out from the positive (+) terminal.)
When the thermocouple/mV input burnout setup is set at "upscale at burnout":
0.05 µA (flowed out from the positive (+) terminal or flowed into the positive (+) terminal)
When the thermocouple/mV input burnout setup is set at "unknown at burnout."

Input impedance: 1 MΩ min.

Burnout indication: Upscale or unknown can be selected in the thermocouple/mV input burnout setup.

Allowable parallel connection resistance:
1 MΩ min., Burnout detection is provided.

- **RTD input**

Indication accuracy (under standard conditions):

Sensor type	Range	Input indication accuracy
Pt100	-200.0 to +850.0 °C	±0.3 °C
	-200.00 to +300.00 °C	±0.15 °C
JPt100	-200.0 to +640.0 °C	±0.3 °C
	-200.00 to +300.00 °C	±0.15 °C

Measuring current: 1 mA ± 0.02 mA Flowed out from the terminals A and C to the terminal B.

Allowable wiring resistance: 85 Ω max. including the Zener barrier resistance per RTD.

Effect of wiring resistance: 0.02 °C/Ω max., wiring resistance is 85 Ω max.

Burnout indication: Burnout of terminal A, upscale
Burnout of terminal B or C, or two or more wires, downscale

- **DC voltage (mV-range) input**

Indication accuracy
(under standard conditions): ±0.1 %FS ±1 digit

Allowable input voltage: -1.0 V to +2.5 V

⚠ CAUTION: Do not apply a voltage exceeding the allowable input voltage.
Doing so might cause this unit to malfunction.

Input bias current: 0.2 µA (flowed out from the positive (+) terminal.)
When the thermocouple/mV input burnout setup is set at "upscale at burnout"
0.05 µA (flowed out from the positive (+) terminal or flowed into the positive (+) terminal)
When the thermocouple/mV input burnout setup is set at "unknown at burnout"

Input impedance: 1 MΩ min.
Burnout indication: Upscale or unknown can be selected in the thermocouple/mV input burnout setup.

- **DC voltage (V-range) input**

Indication accuracy
(under standard conditions): ±0.1 %FS ±1 digit
Allowable input voltage: -1.0 V to +25 V
⚠ CAUTION: Do not apply a voltage exceeding the allowable input voltage.
Doing so might cause this unit to malfunction.
Input bias current: 1 µA max. (flowed out from the positive (+) terminal or flowed into the positive (+) terminal)
Each of 0 to 1 V and -1 to +1 V ranges
5 µA max. (flowed into the positive (+) terminal.)
Each of 1 to 5 V and 0 to 5 V ranges
10 µA max. (Flowed into the positive (+) terminal.)
0 to 10 V range
Input impedance: 1 MΩ min.
Burnout indication: Equivalent to 0 V-input

- **DC current input**

Indication accuracy
(under standard conditions): ±0.1 %FS ±1 digit
Allowable input voltage: -1 V to +4 V
⚠ CAUTION: Do not apply a voltage exceeding the allowable input voltage.
Doing so might cause this unit to malfunction.
Input impedance: 110 Ω max.
Burnout indication: Downscale 4 to 20 mA range
Equivalent to 0 mA-input 0 to 20 mA range

● Digital input (DI)

Types of connectable outputs: Dry contact or transistor (sink type)
Open terminal voltage: 7 Vdc ±15 %
Terminal current
(during short-circuit): 3 to 7 mA
Allowable ON contact resistance: 500 Ω max.
Allowable OFF contact resistance: 100 kΩ min.
Allowable ON residual voltage: 1.5 V max.
Allowable OFF-state leakage current: 0.1 mA max.
ON/OFF minimum detectable pulse width:
25 ms min.

● Control output (Control output (OUT) / auxiliary output (AUX) / event output (EV))

- **Relay output (outputs 1 and 2)**

Contact configuration: 1a1b or 1a, selected by the model No.
Contact rating: 3 A 250 Vac/30 Vdc 1a1b, resistance load
1 A 250 Vac/30 Vdc 1a, resistance load

Contact voltage:	250 Vac max./125 Vdc max.
Life:	Min. 100,000 operations, rated load
Min. switching specifications:	100 mA /5 Vdc 1a1b
	10 mA/5 Vdc 1a

- **Relay output (output 3, 4 and 5)**

Contact configuration:	1a
Contact rating:	3 A 250 Vac/30 Vdc resistance load
Contact voltage:	250 Vac max./125 Vdc max.
Life:	Min. 100,000 operations, rated load
Min. switching specifications:	100 mA/5 Vdc

- **Current output**

Output current:	4 to 20 mAdc (2.4 to 21.6 mAdc)
	0 to 20 mAdc (0.0 to 22.0 mAdc)
Load resistance:	600 Ω max.
Output accuracy:	±0.1 %FS (standard conditions)
Output resolution:	1/15,000
Open terminal voltage:	23 Vdc max.

- **Continuous voltage output**

Output current:	0 to 5 Vdc (0.0 to 5.5 Vdc)
	1 to 5 Vdc (0.6 to 5.4 Vdc)
	0 to 10 Vdc (0.0 to 11.0 Vdc)
Load resistance:	1 kΩ min.
Load limit current:	21 mA (standard value under standard conditions)
Output accuracy:	±0.1 %FS (standard conditions)
Output resolution:	1/20000 (for 0 to 10 V)

- **Voltage pulse output**

Output current:	12 Vdc +15 %/-10 %
Load current:	30 mA max.
Load limit current:	52 mA (standard value under standard conditions)
OFF leak current:	0.1 mA max.
Output response time:	500 µs max., 10 % ↔ 90 % of output voltage

- **Transmitter power supply function**

Output current:	24 Vdc ±10 %
Load current:	30 mA max.
Load limit current:	45 mA (standard value under standard conditions)
Ripple voltage:	100 mV max. (standard conditions)

● **Digital output (DO)**

Output type:	Transistor (sink type)
Load voltage:	4.5 to 28 Vdc
Load current:	70 mA max./point
	500 mA max./unit
ON-state residual voltage:	0.5 V max.
OFF-state leakage current:	0.1 mA max.

● RS-485 communications

Transmission line:	RS-485, 3-wire method 3-wire system multi-drop
Transmission speed:	4800, 9600, 19200, 38400 bps
Transmission distance:	500 m max.
Connectable units:	32 max. (including master station)
Communication system:	Half-duplex, start/stop synchronization
Terminating resistor:	150 Ω, at both ends of the line
Bit length:	8 bits/7 bits
Stop bit length:	1 or 2 bits
Parity bit:	Even parity, odd parity, or non-parity
Communication protocol:	CPL

● Environmental conditions

• Standard conditions

Ambient temperature:	23 ±2 °C
Ambient humidity:	60 ±5 %RH
Rated power supply voltage:	105 Vac ±1 %
Power frequency:	50 ±1 Hz or 60 ±1 Hz
Vibration resistance:	0 m/s^2
Shock resistance:	0 m/s^2
Mounting angle:	Reference plane ±3 °
Warm-up time:	30 min or longer

• Operating conditions

Ambient temperature:	0 to 50 °C (mounting of single unit) 0 to 40 °C (tightly mounting of 3 or more units)
Ambient humidity:	10 to 90 %RH (without condensation)
Rated power supply voltage:	85 to 264 Vac
Power frequency:	50 ±2 Hz or 60 ±2 Hz
Vibration resistance:	0 to 2 m/s^2 10 to 60 Hz for 2 h each in X, Y, and Z directions
Shock resistance:	0 to 10 m/s^2
Mounting angle:	Reference plane ±10 °
Altitude:	2000 m max.

• Transportation conditions

Ambient temperature:	-20 to +70 °C
Ambient humidity:	10 to 95 %RH without condensation
Vibration resistance:	0 to 5 m/s^2 10 to 60 Hz for 2 h each in X, Y, and Z directions
Shock resistance:	0 to 500 m/s^2

● Other specifications

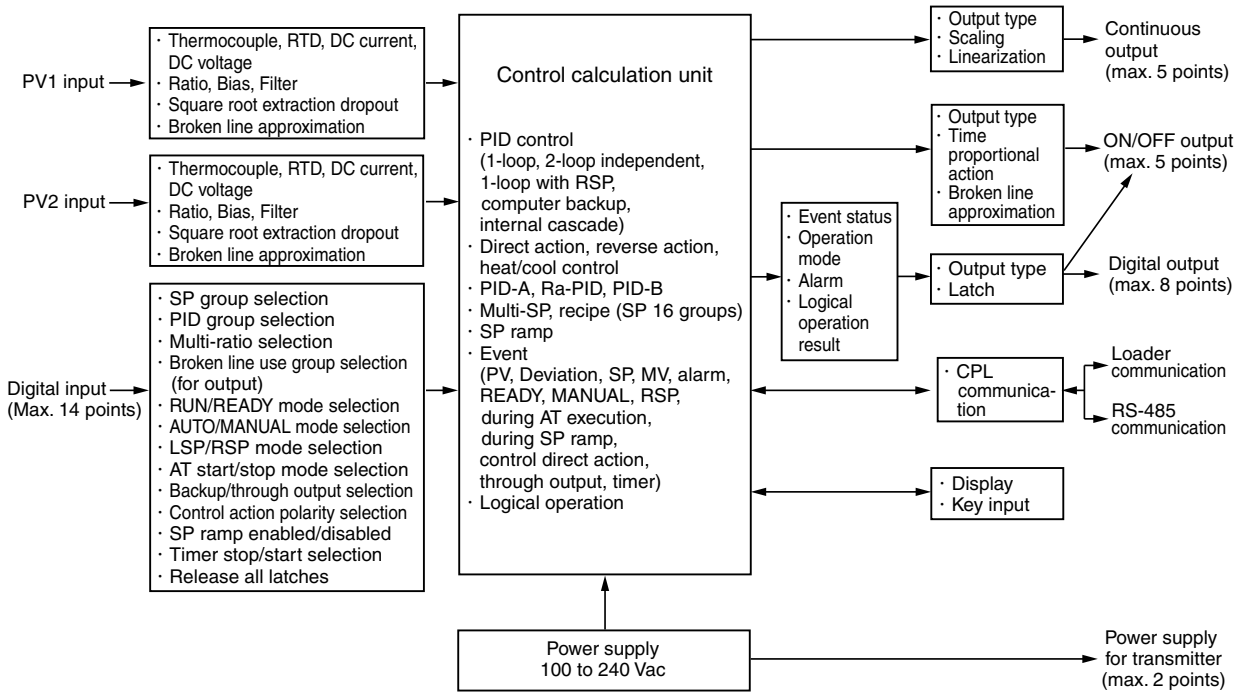
Rated power voltage:	100 to 240 Vac
Power consumption:	30 VA max. (SDC45A) 40 VA max. (SDC46A)
Power ON inrush current:	35 A max./10 ms max.
Allowable transient power loss:	20 ms min.
Insulation resistance:	20 MΩ min. the resistance between power terminals A1 and A2, and FG terminal A3 is measured with a 500 Vdc-megger.

Dielectric strength:	1500 Vac for 1 min (dielectric strength between the power terminals A1, A2 or FG terminal A3 and each input/output terminal, and the dielectric strength between power terminals A1-A2 and FG terminal A3.)
Mass:	Approx. 400 g (SDC45A) (including dedicated mounting bracket) Approx. 700 g (SDC46A) (including dedicated mounting bracket)
Terminal screw tightening torque:	0.4 to 0.6N•m
Protection:	IP65 (under operating conditions)
Standards compliance:	EN61010-1, EN61326
Overvoltage category:	Category II (IEC60364-4-443, IEC60664-1)
Allowable pollution degree:	Pollution degree 2
Mask/case material:	PPO
Mask/case color:	Black
Number of EEPROM writing cycles:	100,000 cycles

Appendices

Appendix 1 Function Block Diagrams

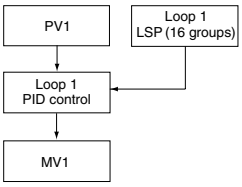
■ Basic function block diagram



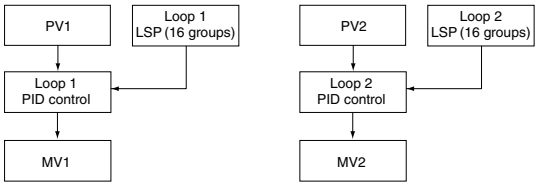
■ Loop process block diagram

There are five kinds of loops. For 1-input model, only "1-loop" is possible.
For 2-input model, configure the setting using the loop type (item display: C-00) in the setup bank. The following shows the process block diagram of each loop:

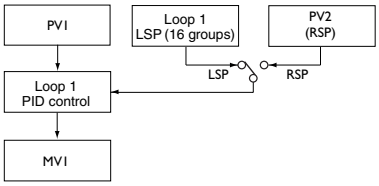
● 1-loop



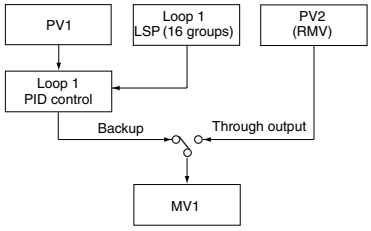
● 2-loop independent



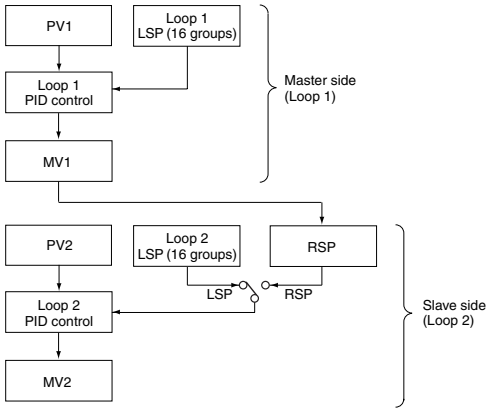
● 1-loop with RSP



● Computer backup

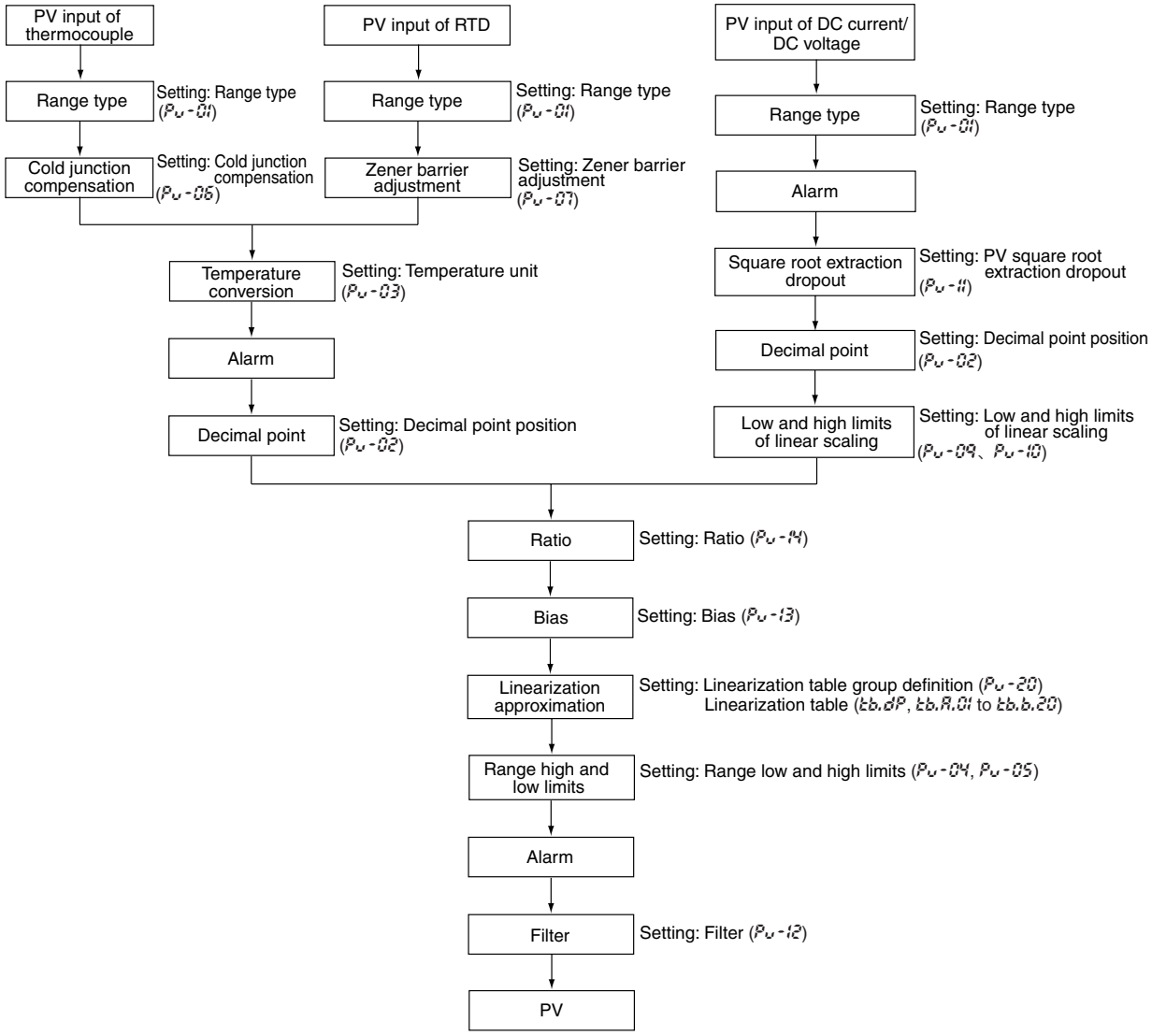


● Internal cascade



■ PV input process block diagram

1-input model has one PV channel while 2-input model has two PV channels. Both the PV1 and PV2 perform the same process. Settings are provided for each channel.

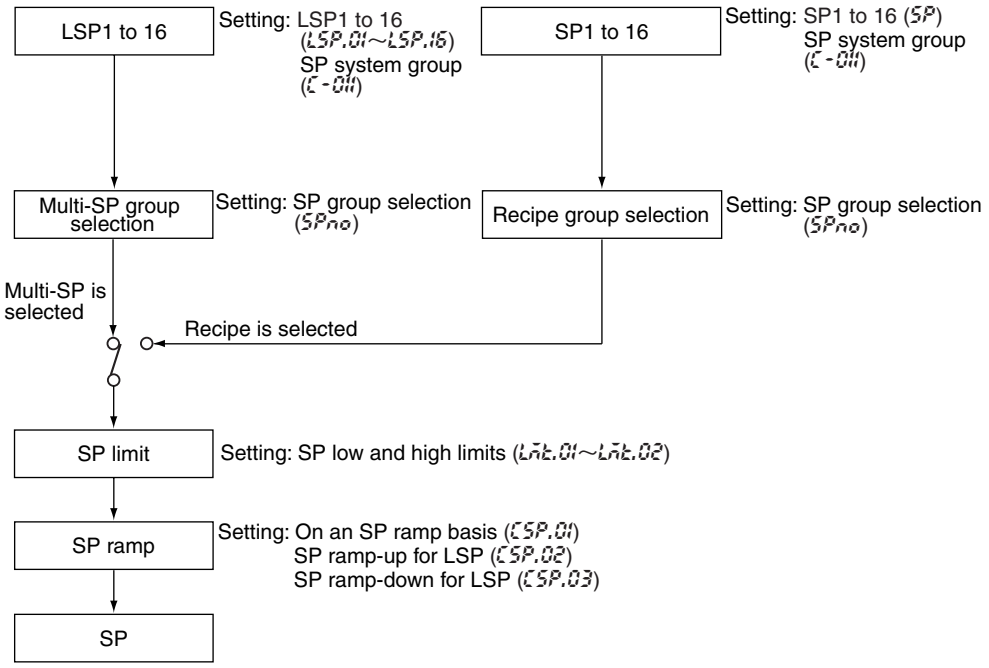


■ SP process block diagram (1-loop independent)

The following describes a SP process for 1-loop without use of RSP and internal cascade.

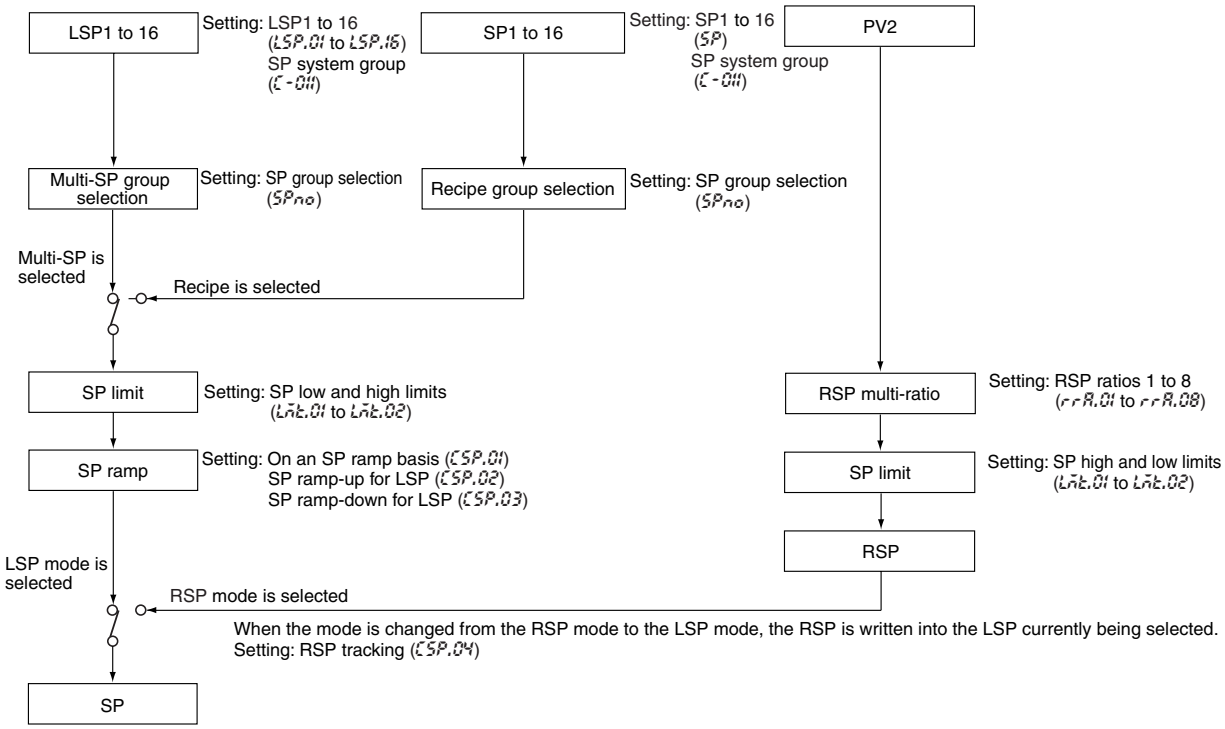
For 2-loop independent, the same SP process is provided for two loops. Therefore, there are settings for two loops.

When using the computer backup, the SP process is provided only for one loop.



■ SP process block diagram (with RSP)

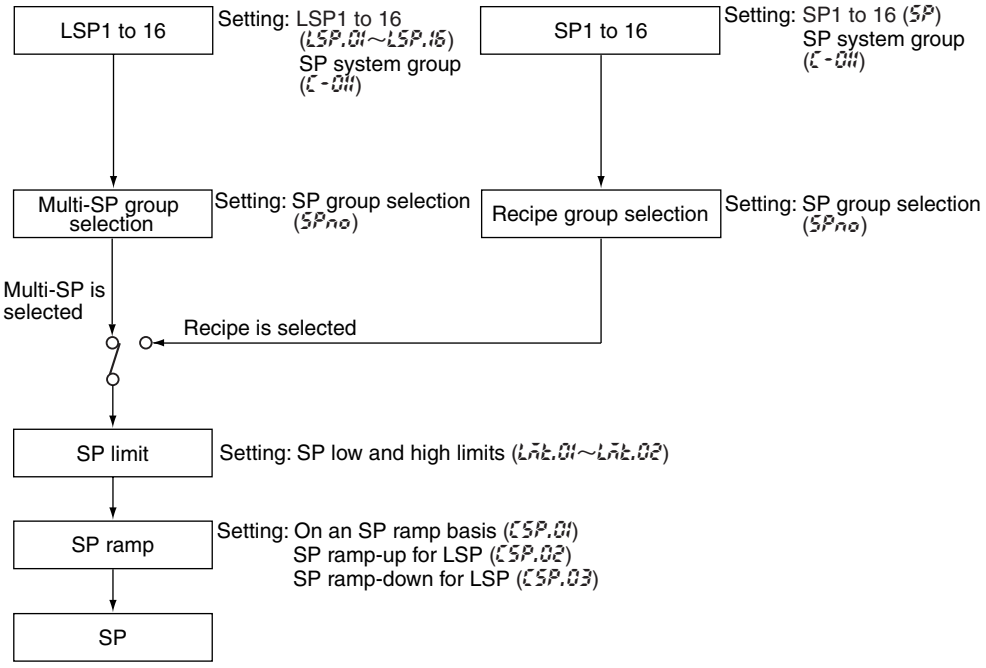
The following describes a SP process for 1-loop with RSP. The PV2 is used as RSP:



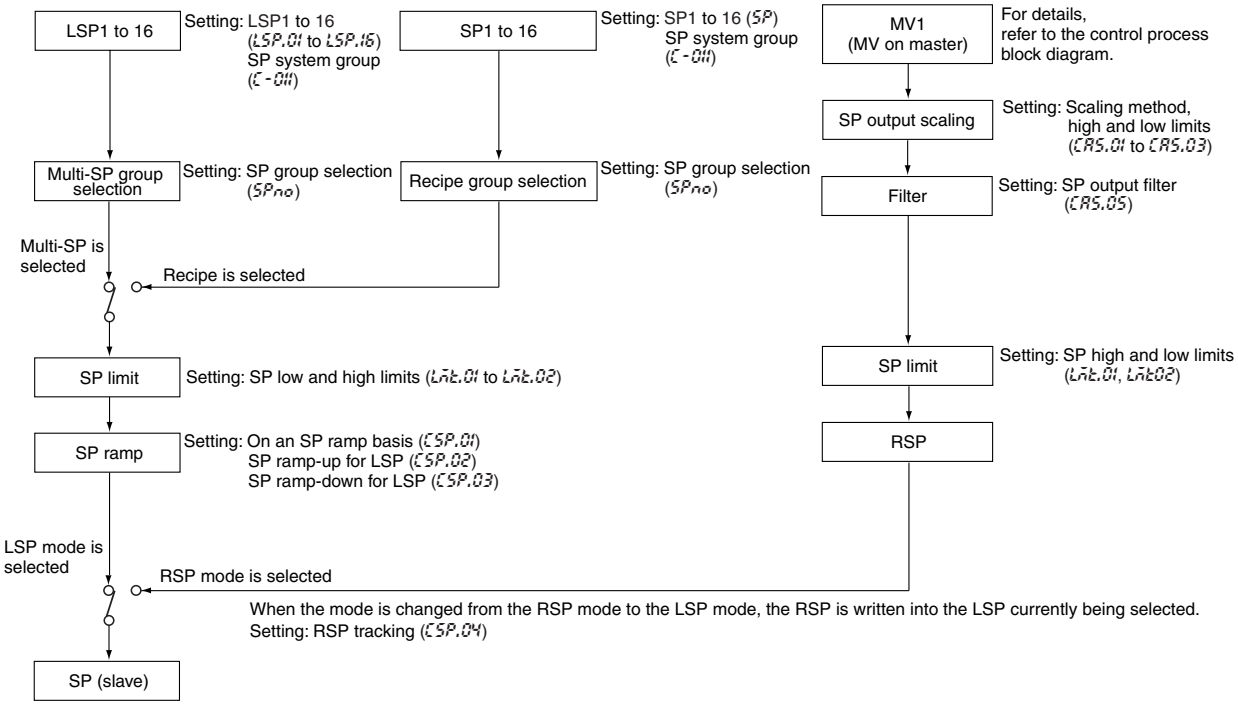
■ SP process block diagram (internal cascade)

The following describes a SP process with the internal cascade:
The master and slave use different SP processes. The master uses the loop 1 setting while the slave uses the loop 2 setting. The MV on the master is converted through the SP output scaling and it is used for the RSP on the slave.

● Master (loop 1)

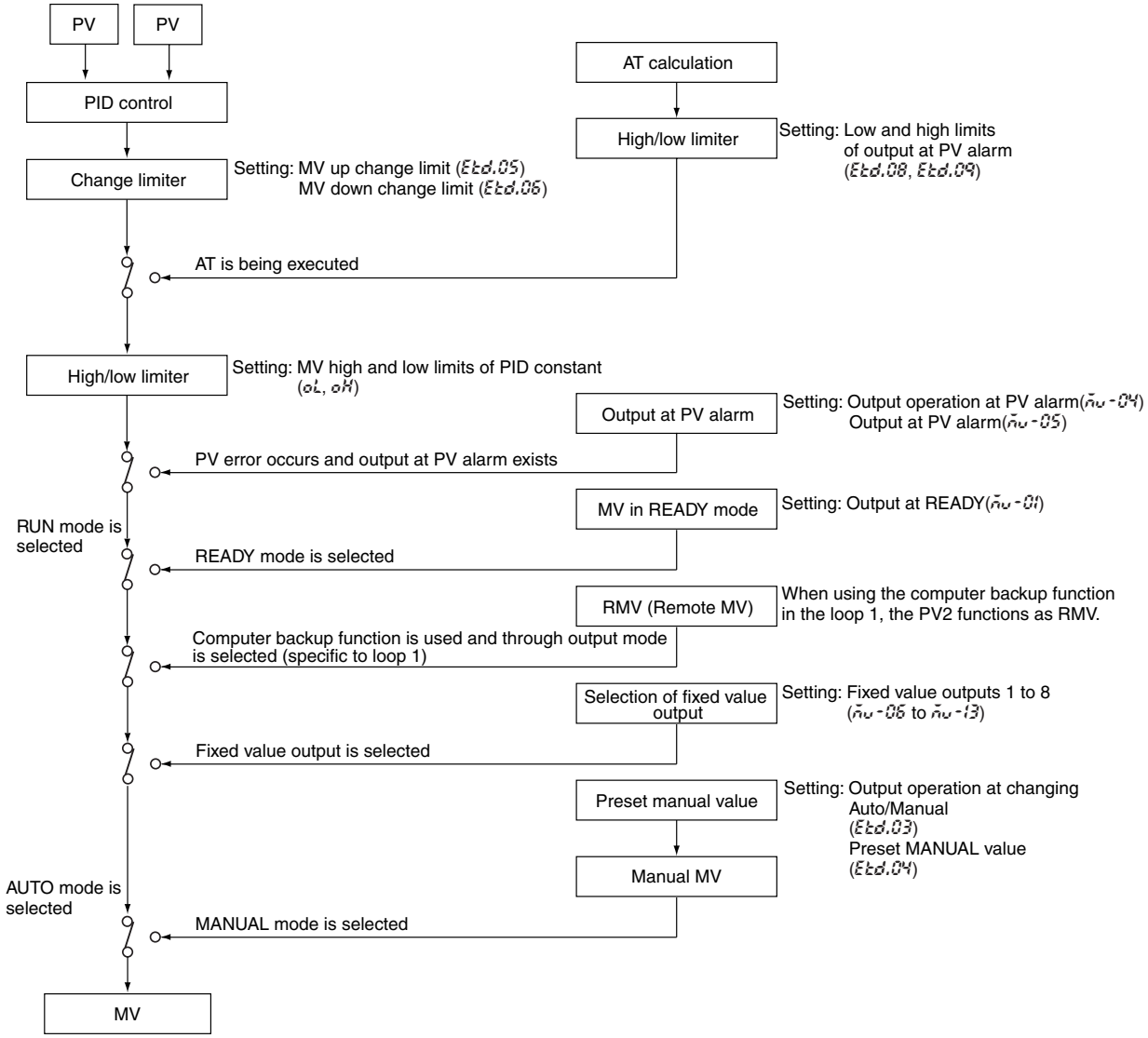


● Slave (loop 2)



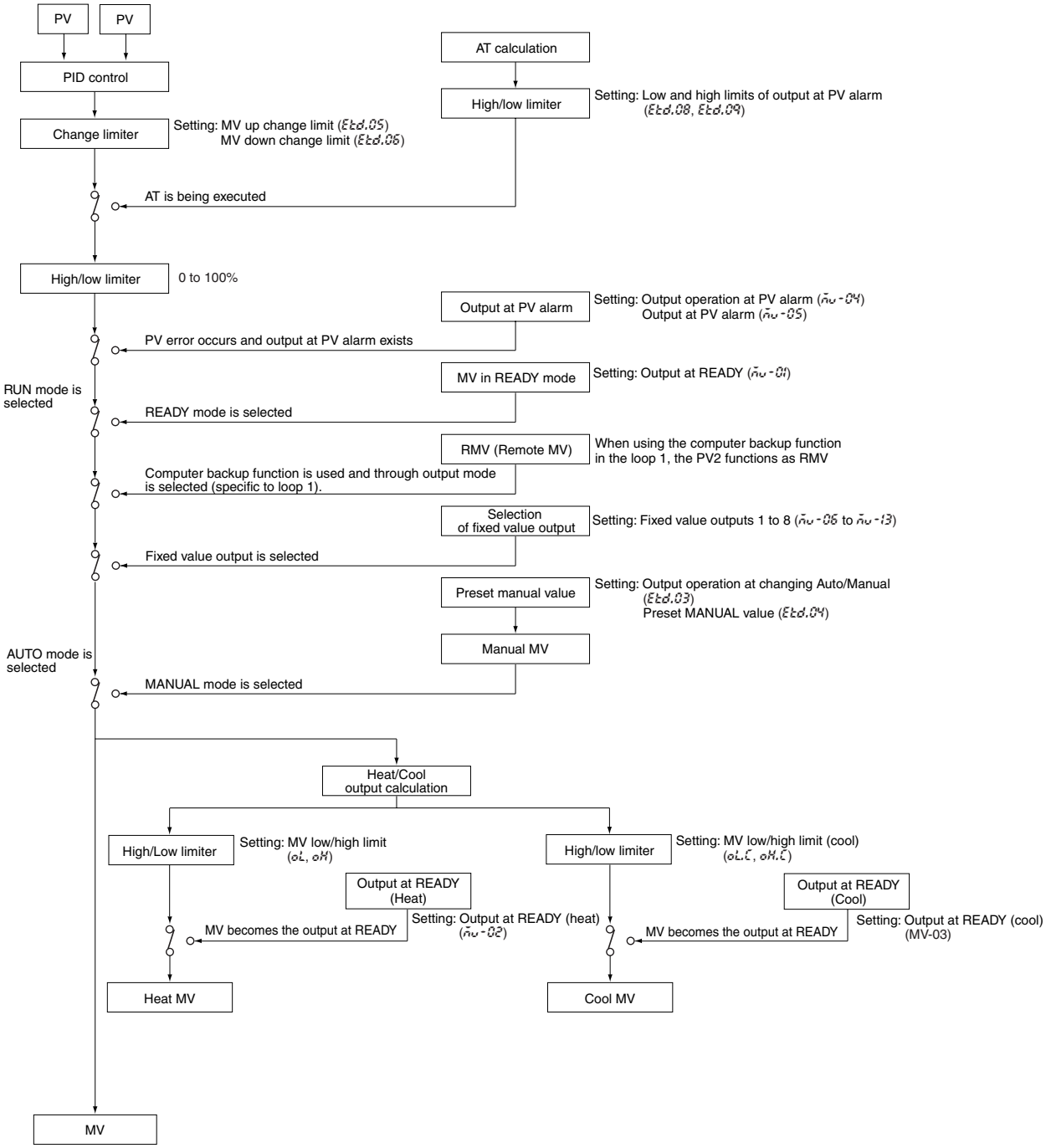
■ Control process block diagram (direct or reverse action)

In the 1-loop control, PV, SP, and MV are provided for one loop. Accordingly, PV, SP, and MV are provided for two loops in the 2-loop control.
Both the MV1 and MV2 perform the same process in a control process other than the computer backup. The computer backup can be performed only in loop 1.
There are settings for each channel.



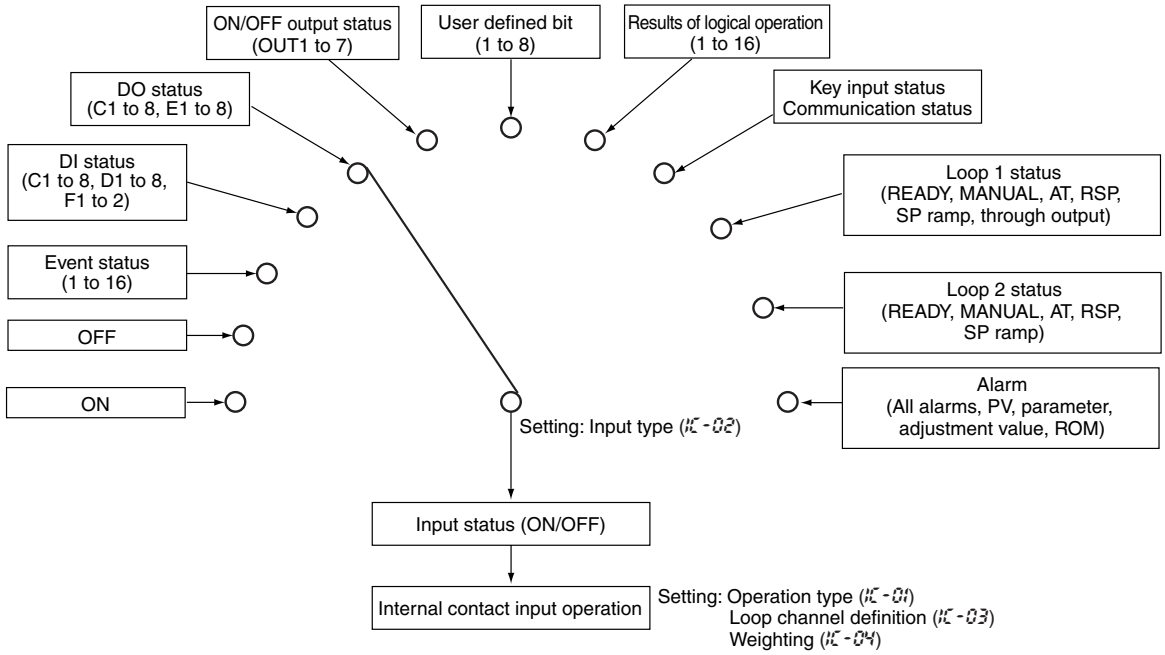
■ Control process block diagram (heat/cool control)

In the 1-loop control, PV, SP, and MV are provided for one loop. Accordingly, PV, SP, and MV are provided for two loops in the 2-loop control.
Both the MV1 and MV2 perform the same process in a control process other than the computer backup. The computer backup can be performed only in loop 1.
There are settings for each channel.



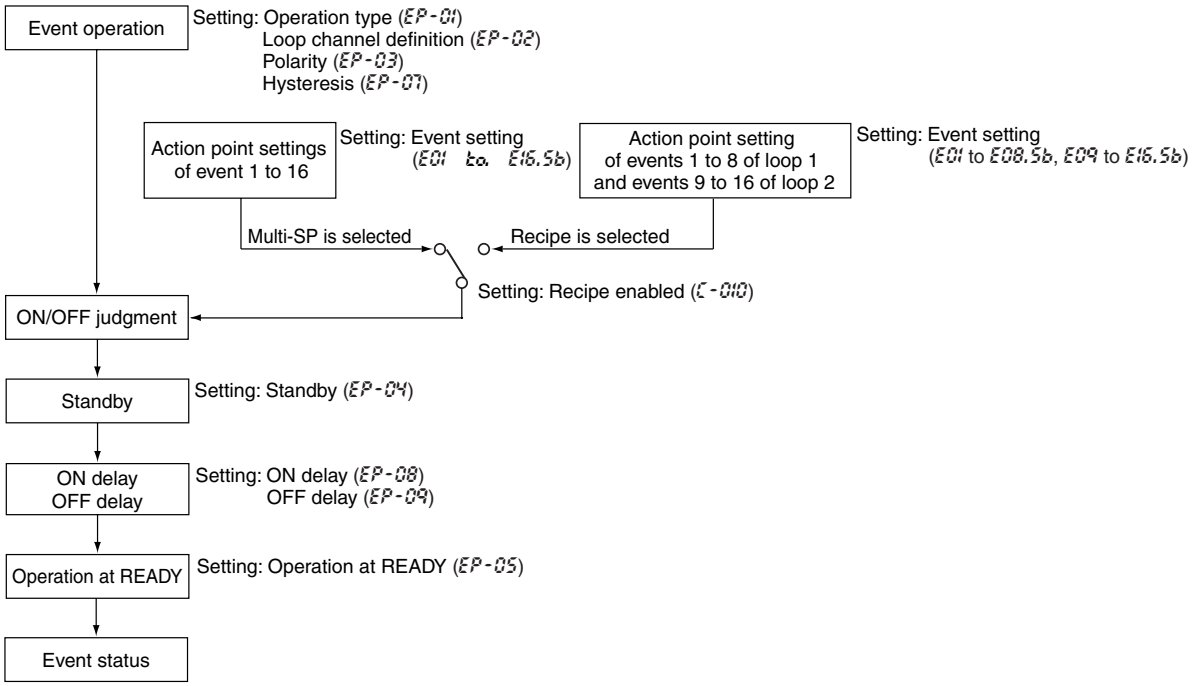
■ Internal contact input process block diagram

There are 20 groups of internal contact input processes. All groups use the same process. Settings are provided for each group.



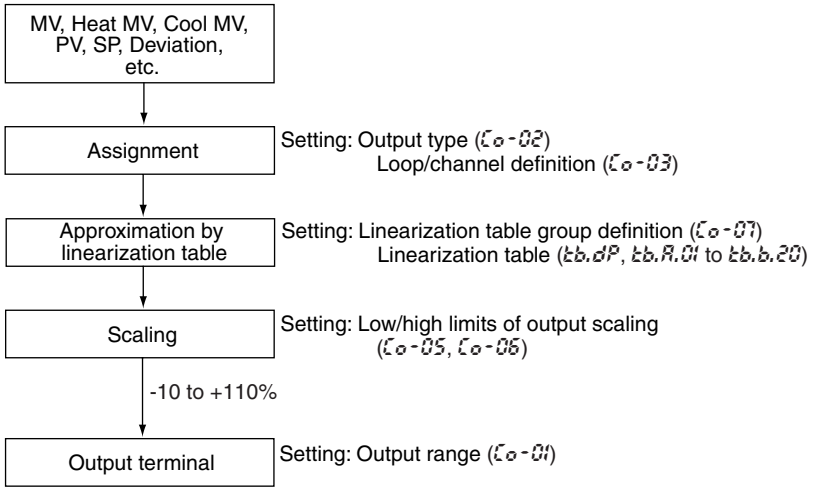
■ Event process block diagram

There are 16 groups of event processes. All groups use the same process. Settings are provided for each group.



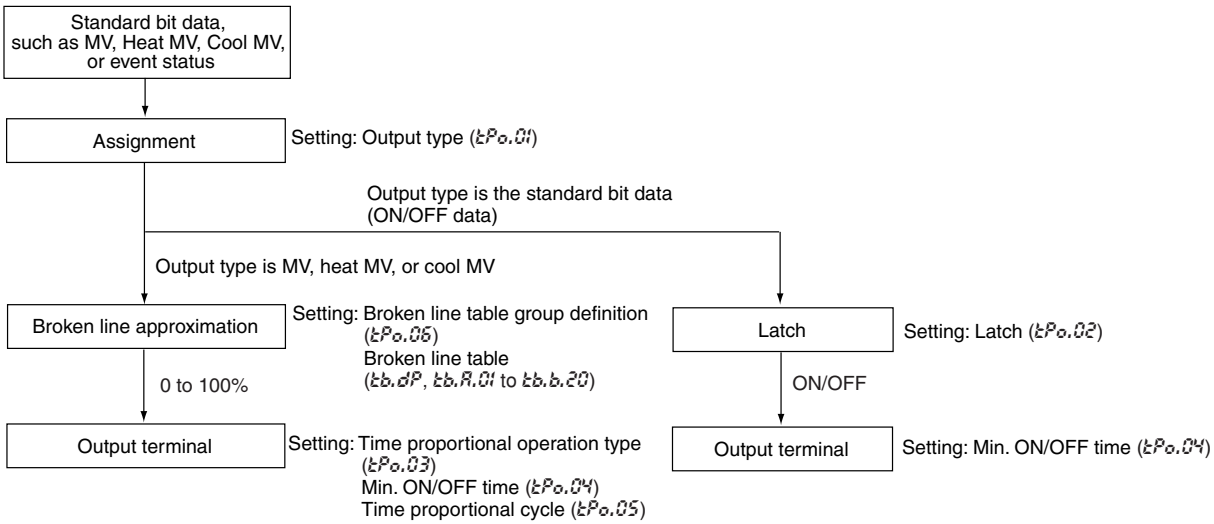
■ Continuous output process block diagram

The following shows the current output and continuous voltage output processes:



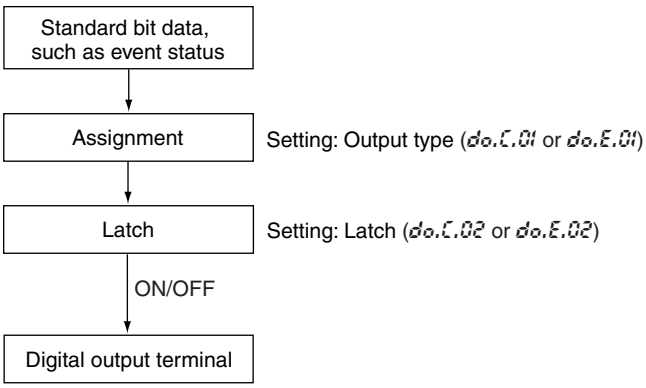
■ ON/OFF output process block diagram

The following shows the relay output and voltage pulse output processes:



■ Digital output process block diagram

The following shows the process of the digital output (DO) terminals:



Appendix 2 Standard Bit Codes and Standard Numerical Codes

■ Standard bit codes

The range of the standard bit codes is 1024 to 2047.
Codes not stated in the list are undefined. Therefore, do not use such codes
The standard bit codes are set values common to the following items:

- Output type (EPo.01) of output bank (ON/OFF output)
- Input type (IC-02) of internal contact input bank
- Output type (doC.01, doE.01) of digital output (C/E-column terminal)
- Input assignment A/B/C/D (bF-02 to bF-05) of logical operation
- Lighting conditions (n5-01) for display and key bank (MS display)
- Lighting conditions (UFL-01) for display and key bank (UFLED setting)
- Tracking selection (CAS-04) of MV bank

Standard bit code	Meaning of standard bit
1024	OFF (0)
1025	ON (1)
1088	Event 1
1089	Event 2
1090	Event 3
1091	Event 4
1092	Event 5
1093	Event 6
1094	Event 7
1095	Event 8
1096	Event 9
1097	Event 10
1098	Event 11
1099	Event 12
1100	Event 13
1101	Event 14
1102	Event 15
1103	Event 16
1152	Terminal status of DI-C1
1153	Terminal status of DI-C2
1154	Terminal status of DI-C3
1155	Terminal status of DI-C4
1156	Terminal status of DI-C5
1157	Terminal status of DI-C6
1158	Terminal status of DI-C7
1159	Terminal status of DI-C8
1160	Terminal status of DI-D1
1161	Terminal status of DI-D2
1162	Terminal status of DI-D3
1163	Terminal status of DI-D4
1164	Terminal status of DI-D5
1165	Terminal status of DI-D6
1166	Terminal status of DI-D7
1167	Terminal status of DI-D8
1176	Terminal status of DI-F1
1177	Terminal status of DI-F2
1216	Terminal status of DO-C1
1217	Terminal status of DO-C2
1218	Terminal status of DO-C3
1219	Terminal status of DO-C4
1220	Terminal status of DO-C5
1221	Terminal status of DO-C6
1222	Terminal status of DO-C7
1223	Terminal status of DO-C8

Standard bit code	Meaning of standard bit
1232	Terminal status of DO-E1
1233	Terminal status of DO-E2
1234	Terminal status of DO-E3
1235	Terminal status of DO-E4
1236	Terminal status of DO-E5
1237	Terminal status of DO-E6
1238	Terminal status of DO-E7
1239	Terminal status of DO-E8
1280	OUT1 (ON/OFF status)
1281	OUT2 (ON/OFF status)
1282	OUT3 (ON/OFF status)
1283	OUT4 (ON/OFF status)
1284	OUT5 (ON/OFF status)
1285	OUT6 (ON/OFF status)
1286	OUT7 (ON/OFF status)
1408	User defined bit 1
1409	User defined bit 2
1410	User defined bit 3
1411	User defined bit 4
1412	User defined bit 5
1413	User defined bit 6
1414	User defined bit 7
1415	User defined bit 8
1440	Results of logical operation 1
1441	Results of logical operation 2
1442	Results of logical operation 3
1443	Results of logical operation 4
1444	Results of logical operation 5
1445	Results of logical operation 6
1446	Results of logical operation 7
1447	Results of logical operation 8
1448	Results of logical operation 9
1449	Results of logical operation 10
1450	Results of logical operation 11
1451	Results of logical operation 12
1452	Results of logical operation 13
1453	Results of logical operation 14
1454	Results of logical operation 15
1455	Results of logical operation 16
1504	Key status (auto/man)
1505	Key status (sp/ev)
1506	Key status (para)
1507	Key status (rsp/lsp)
1508	Key status (at)

Standard bit code	Meaning of standard bit
1509	Key status (f1)
1510	Key status (f2)
1511	Key status (up)
1512	Key status (left)
1513	Key status (right)
1514	Key status (down)
1515	Key status (display)
1516	Key status (enter)
1545	Communication status (Normal receipt on a byte basis)
1547	Communication status (Normal transmission on a byte basis)
1548	Communication status (An error received)
1568	RUN/READY status of loop 1
1569	RUN/READY status of loop 2
1584	AUTO/MANUAL status of loop 1
1585	AUTO/MANUAL status of loop 2
1600	AT stop /AT status of loop 1
1601	AT stop /AT status of loop 2
1616	LSP/RSP status of loop 1
1617	LSP/RSP status of loop 2
1648	During SP ramp of loop 1 (ramp-up)
1649	During SP ramp of loop 2 (ramp-up)
1664	During SP ramp of loop 1 (ramp-down)
1665	During SP ramp of loop 2 (ramp-down)
1696	Backup/through output status of loop 1
1792	All typical alarms (logical OR of all alarms to be displayed)
1824	PV input high limit alarm (PV1)
1825	PV input high limit alarm (PV2)
1840	PV input low limit alarm (PV1)
1841	PV input low limit alarm (PV2
1856	CJ input alarm (PV1)
1857	CJ input alarm (PV2)
1968	Parameter failure
1969	Adjustment value failure (CPU board)
1970	Adjustment value failure (PV board)
1972	ROM failure (CPU board)
1973	ROM failure (PV board)

■ Standard numerical codes

The range of the standard numerical codes is 2048 to 3071.
Codes not stated in the list are undefined. Therefore, do not use such codes.
The standard numerical codes are set values common to the following items:

・Output type (Co-02) of output bank (continuous output)
・Lighting status (n5-02) of display and key bank (MS display)

Standard numerical code	Meaning of standard bit
2304	PV1
2305	PV2
2320	PV of loop 1 (used for PID control)
2321	PV of loop 2 (used for PID control)
2336	SP of loop 1 (in use)
2337	SP of loop 2 (in use)
2352	SP of loop 1 (finally attained value)
2353	SP of loop 2 (finally attained value)
2384	SP output of loop 1
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2433	Heat MV of loop 2
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2449	Cool MV of loop 2
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2529	Deviation of loop 2 (PV-SP)
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2659	Event 4 delay remaining time
2660	Event 5 delay remaining time
2661	Event 6 delay remaining time
2662	Event 7 delay remaining time
2663	Event 8 delay remaining time
2664	Event 9 delay remaining time
2665	Event 10 delay remaining time
2666	Event 11 delay remaining time
2667	Event 12 delay remaining time
2668	Event 13 delay remaining time
2669	Event 14 delay remaining time
2670	Event 15 delay remaining time
2671	Event 16 delay remaining time

Appendix 3 Abbreviations and Terms

Abbreviations are used in descriptions, tables, and illustrations of this manual. The following describes major abbreviations.

AT:	Auto Tuning. The PID is automatically adjusted at an optimal numeric value.
DI:	Digital input
DISP:	Display. Pressing the [display] key will change the contents of the display.
DO:	Digital output (control output of relay and voltage pulse, and event output)
OL:	Output Low. Output low limit, a minimum limit level of the output, is set.
OH:	Output High. Output high limit, a maximum limit level of the output, is set.
PARA:	Parameter. A variable to determine the operating conditions for this unit. A desired numeric value is set.
PID :	PID has the following meanings.
	P (Proportioning). Proportional operation.
	I (Integral). Integral operation or reset operation.
	D (Derivative). Derivative operation or rate operation.
PV:	Process Variable. Measured values of the thermocouple, RTD, and linear input.
SP:	Set value of Set Point. For example, set point to control the temperature.
LSP :	Local Set Point. A set value stored in the controller.
RSP:	Remote Set Point. A set value given from the outside by the analog signal.
MV:	Manipulated Variable. An output of the instrument to be controlled. This output shows the PID control results.
LMV:	Local Manipulated Variable. When the loop type is set at computer backup, MV of the PID control result of this unit is called "LMV". "LMV" is distinguished from "RMV", an MV given from the outside.
RMV:	Remote Manipulated Variable. MV given from the outside by the analog signal.
Setup:	Setup is a setting operation corresponding to how to use a unit that incorporates operating conditions, such as control action.
Hysteresis:	An operation gap during event operation. A difference between the value at which the event OFF is changed to ON and the value at which the event ON is changed to OFF.
	Hysteresis is shown as "(HYSR" in the Figs. in this manual.
EV:	Event. EV shows a set value of the event function. The event function is the ON/OFF signal function, which is output in the control status.
	EV with numeric values added, like EV1 or EV2 shows an event function. A numeric value shows relevant event No.

U:	An abbreviation of "Unit". This shows the minimum unit of the setting. When the number of digits below the decimal point of the set value is "0", "1", "2", "3", and "4", 1U=1, 1U=0.1, 1U=0.01, 1U=0.001, and 1U=0.0001, respectively.
Cascade control:	Control method that two PID controllers are connected in series. This control method is effective if a large response delay exists between the operation part and measurement point.
Heat/cool output:	Control output, which is output when the heat output is related with the cool output within one controller.
AUTO:	Auto operation status that the PID control result is used as MV.
MANUAL:	Manual operation status that a value manually set by the operator is used as MV.
READY:	Standby status, in which the control calculation is stopped.
RUN:	Status, in which the control calculation is executed.

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